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The Monthly Review

Published by the AMERICAN ELECTROPLATERS' SOCIETY

MARCH 1939 E.M. Baker

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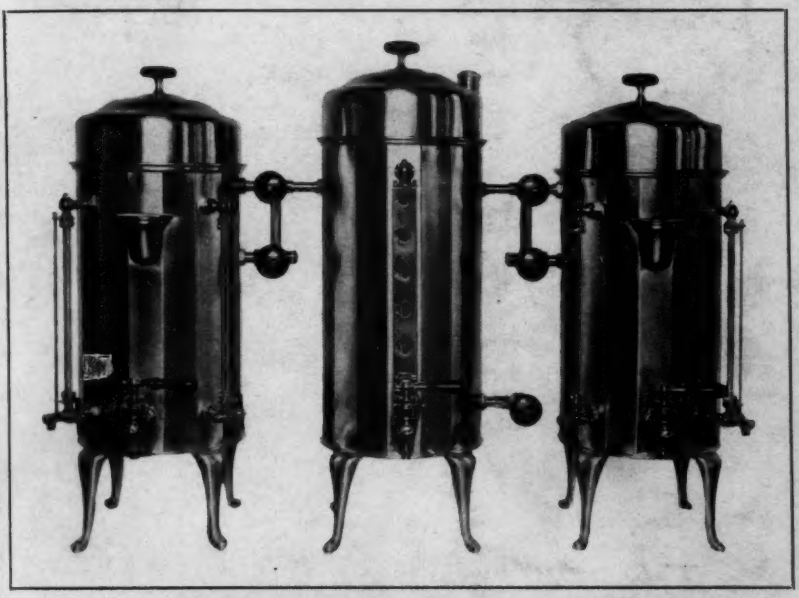

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The Monthly Review

Published by the AMERICAN ELECTROPLATERS' SOCIETY, Inc.

A Society for the Advancement of the Science of Electroplating

MARCH 1939

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SUBSCRIPTION $3.00 A YEAR

Entered as second class matter at the Post Office at Springfield, Mass., September 8, 1930, under Act of August 24, 1912.

Acceptance for mailing at special rate of postage, provided for in section 1103, Act of February 28, 1925, authorized September 3, 1926.

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The MONTHLY REVIEW

Published by the
AMERICAN ELECTROPLATERS' SOCIETY, INC.

Publication and Editorial Office
90 Maynard St.
Springfield, Massachusetts

VOL. XXVI MARCH 1939 NO. 3

Papers and Exhibit Awards

At the Asbury Park Convention

This seems to be an opportune time to call the attention of our members and others who contemplate presenting papers, and exhibits at this year's convention to the awards, and the rules governing such awards.

Each year the President appoints a committee on papers' awards and a committee on exhibits. Both of these committees are published in this issue of the REVIEW.

There are three distinct awards for papers: The Founders Gold Medal, to be given only to an active member of the society who in the opinion of the committee presents the best paper on electroplating or allied subjects. The A.E.S. Gold Medal, is given to any member of the society, active or associate, whose paper is considered best. The Proctor Memorial Award, presented by the Founder in memory of his deceased wife, Mrs. Herminie Dorothea Proctor. This is an award of $100.00 and is open to all who wish to compete. The decision of the committee in all cases is final.

In making their decision the members of the committee base the selection of the best papers on factors similar to these: I. Originality of thought, II. Amount of work involved, III. Value to electroplating, IV. Quality and accuracy of work and presentation.

At the close of the convention last year, the papers' award Committee suggested that inasmuch as Branch papers were excluded from the above awards, it would be advisable to provide an incentive for the continuation of such papers. It was suggested that a cup be presented, to become the property of the Branch winning it three years in succession. The name of the winning Branch is to be engraved on the cup. Mr. C. E. Clindinin, Chairman of the Committee, advised the members that Mr. George Spencer, of the Crown Rheostat and Supply Company, Chicago, would present a silver cup to be known as the Sam Heunerfauth Award in recognition of the latter's untiring efforts in the A.E.S., and the plating industry in general. This gift was accepted by the

convention and will cover the period from June to June of each year and will be awarded at the Asbury Park Convention this year.

EXHIBITS

It is hoped that definite recommendations regarding rules for judging exhibits will be drawn up this year in order to give the Exhibits Committee something to guide them. The following suggestions were given to Mr. Austin Fletcher, the Exhibits Committee Chairman last year in judging the exhibits:

I. Skill used in production
II. Care used in execution
III. Practical value of finish
IV. Artistic value of finish
V. Originality
VI. The exhibit which imparts the most knowledge.
VII. The exhibit which serves the largest part of our members
VIII. Value of exhibit to industry
IX. Difficulty of applying finish
X. Quality
  a. Uniformity
  b. Throwing power
  c. Pitting
  d. Cut throughs
  e. Luster

Variety and types of finishes
Variety and types of material finished.

In awarding the cup presented by Metal Industry and which is now in possession of Dayton Branch, it is not necessary that the formula accompany the exhibit. This cup is for Branch exhibits only.

These additional suggestions have been offered in judging Branch exhibits:

Percentage of Branch members exhibiting
Size of exhibit
Attractiveness from a non-technical standpoint

Individual exhibitors are asked to furnish two copies of formulae and procedure, one copy to remain with the exhibit, the other to be placed in the hands of the Committee.

Membership Committee

In a recent article by President Phillips, published in the January number of the MONTHLY REVIEW, a plea is made for friendship and co-operation among the members of the A.E.S. These are essential if the Membership Drive that has been conducted for the past nine months, and will continue until the next Convention to be held at Asbury Park in June, is to be

brought to a successful conclusion. I do know that most local branch chairmen who were appointed at the beginning of the fiscal year have been doing a splendid job in securing new members for our Society, and those who have not accomplished as much need the co-operation of all their branch members in order to complete a successful year.

At this writing the following branches have gone over the top with their quota of new members:

Grand Rapids Branch, under the leadership of Charles Werft, chairman, has added 27 new members.

St. Louis Branch has taken in 31 new members with Ed. Musick, chairman.

New Haven Branch has 20 new members with Henry Creamer, chairman.

Buffalo Branch has 20 new members,, D. L. Ripley, chairman.

Detroit Branch has 61 new members with Carl Heussner, chairman. Mr. Heussner, I have been told, is personally responsible for most of the applications brought in.

A large membership of qualified men brings about a healthy condition to your local branch and becomes the means to be an outstanding source of help to the manufacturers located in your vicinity. Manufacturers are becoming more and more interested in our Society and are being impressed by its growth, which means they will be more willing to contribute their money to carry on the work of research that has been conducted for the past several years.

We want to be known as a Society that is a help not only to the manufacturers who have so liberally contributed their money to carry on the work of the Research Fund, but to the practical and technical platers as well, who have given of their time and effort in building up our Society.

Doing things in a big way can only be accomplished by the combined effort and co-operation of our entire membership, and the friendship that must exist in order to carry on any successful enterprise.

The writer joined the Society in 1915 and has watched its growth with a great deal of interest. He has been privileged to work under the leadership of practical and technical men who have devoted their time and talent to the upbuilding of a great institution that has been a means through its educational sources of enabling its members to carry on with those perplexing problems that arise.

I am making this appeal for you to co-operate with your membership chairman in the closing months that we may again show a substantial increase in our membership.

R. M. GOODSELL,
Chairman of Membership Committee.

ADVANTAGES

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AT ASBURY PARK, N. J.

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CHEMISTS: — Key Men in the Industry Will Attend, to See Latest Developments. *Will You Be One?*

TO ALL INTERESTED: — Keep in Touch With Convention Information, Then *Attend* It.

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NEWARK BRANCH, A. E. S. HOTEL DOUGLAS, NEWARK, N. J.

The **Development** *of a Process for High Speed* **Copper Plating** *from* **Cyanide Solutions**

F. F. OPLINGER
E. I. duPont de Nemours & Co.
Read Before Several Branches of the A. E. S.

IN 1938, after 8 years of intensive research and experiment a new process for the electrodeposition of copper from cyanide solutions was made available commercially. This, the du Pont "High Speed" Copper process, was the first successful and practicable method for the rapid production of smooth, heavy bright deposits of copper on a wide variety of articles. Not only was there an improvement in the character and appearance of the deposit, but the plating was carried out in considerably shorter time than was generally possible in commercial practice —from 1/2 to 1/4 the usual time.

Up to the time of "High Speed" Copper, it was generally recognized that the efficient operation of a copper cyanide solution was a hard job for even the expert plater. Solution control was almost impossible when cathode efficiency might vary from 20 to 90% and the anode efficiency, due to poor anode corrosion, from 0 to 100%. Under such conditions, frequent adjustment was required to maintain an operable solution. Consistent production of deposits of uniform thickness was practically out of the question. The commercial production of heavy, smooth, bright coatings of 0.001" or more was often impossible and always impractical, because of the time and trouble. Cyanide decomposition was usually high, sometimes as much as 1-2 oz./gal. per 8-hour day. The result was an excessive carbonate formation and a "gassy" bath due to evolution of ammonia and cyanide fumes, which was both a nuisance and a hazard. Under these circumstances, it's easy to see why copper cyanide plating was discontinued at some plants.

Despite these conditions, excellent work was obtained by some expert commercial platers, judging from data published by Jacob Hay (1) and others in plating journals. The introduction and use of Rochelle type solutions were a great step towards

improvement, and with better methods of control, such as those advocated by Graham (2), some of the difficulties were removed. An excellent series of articles by Dr. C. L. Pan(3) provided fine data for copper plating, recommended the use of concentrated copper solutions—one vol. equivalent of copper per 12 oz./gal. of copper cyanide. This, incidentally, is the first published data recommending the concentrated solutions. In general, however, there was very little standard information available on copper-cyanide plating, that was both suitable and practical.

From the above, it was evident that the Rochelle salt bath, while a very valuable contribution and advancement, was not the final answer. The practical way to a method which would end the difficulties was a thorough study and analysis of the fundamentals. This work was started in the du Pont plating laboratories in 1929 and a detailed account of the preliminary experimentation which led to the development of "High Speed" Copper is given elsewhere. The final result of this experimentation, however, was a *new* copper plating process, radically different in operation and results from any of the standard accepted practices for plating copper from cyanide solutions. The difference between the process and the older processes is quite evident in the following comparison.

TABLE I. Comparison of Old Type Copper Cyanide Plating Processes and New du Pont "High Speed" Process

Operating Conditions	*Old Type*	*Rochelle Type*	*High Speed Process*
Anodes	rolled or cast	rolled or cast	High Purity Electrodeposited
Anode Current Density	10-30 A/SF	10-30 A/SF	10-30 A/SF
Anode Efficiency	20-50%	20-50%	100%
Cathode Current Density	10-25 A/SF	25-50 A/SF	10-60 A/SF
Cathode Efficiency	20-60%	20-60%	100%
Temperature of Operation	30°-60°C.	30°-60°C.	70°-80°C.
Type of Deposit	dull matt	smooth matt	bright smooth

OPERATING ADVANTAGES

Smooth, Heavy Deposits.

Uniform bright deposits, suitable for dull and bright nickel plating, can be produced from barrel and still solutions. Best results are obtained on a base metal which is free from imperfections; but, as the deposits are uniform and of fine-grained

structure, they can be buffed very easily to give them a bright shiny appearance. This allows the use of a non-polished metal. This process, however, does not eliminate scratches or die marks. Even the heavyweight coatings are bright and smooth, and the production of bright-smooth deposits of any desired thickness is a good possibility. A thickness of 0.05" has been produced experimentally, but not as yet in commercial work.

Rapid Plating.

Not only can heavy smooth deposits of copper be obtained but the time of plating is about one-fourth the time usually required by regular methods. This is accomplished by a combination of high current densities and 100% cathode efficiency.

High Current Efficiencies.

Results are satisfactory only at about 100% anode and cathode efficiency. By observing this condition there will be no hydrogen at the cathode to cause burning, no evolution of noxious fumes nor should there be any oxygen at the anode to bring about insulation and the excessive cyanide decomposition which was characteristic in the operation of many of the older solutions.

Freedom from Fumes.

Inasmuch as this low free cyanide bath has a negligible chemical or thermal decomposition of sodium cyanide and the 100% anode and cathode efficiencies for any gas evolution with its attendant spray, this bath is free from obnoxious or dangerous fumes.

Good Throwing Power.

Although complete data are not available, commercial results indicate that the throwing power is decidedly better than that obtained in the older processes.

Partial Elimination of Strike Solutions.

Satisfactory deposits have been obtained by direct plating on steel by keeping the "Free Cyanide" in excess of the amount necessary to form the double salt Na_2CuCN_3. With a "strike" less than the above quantity of Free Cyanide is required. After the conventional metal cleaning, viz., solvent degreasing followed by a short cathodic treatment in trisodium phosphate and a mild acid dip, die castings can be plated direct.

High Conductivity.

Up to 3 volts across the bus bars in most still solutions and from 6 to 8 volts for barrel plating.

Low Cyanide Consumption.

Concentrated solutions of the double salt are very stable even at high or boiling temperatures. Excessive decomposition is avoided by operating with low "Free Cyanide", preventing anode insulation and by using only high purity anodes.

Simplified Control.

Control of the bath is simplified by the use of simple tests and the knowledge of purpose and effect of each ingredient. Simple analytical methods are available for the determination of copper, free cyanide and caustic soda, and the addition agents are controlled by the use of a stalagmometer for surface tension measurements.

BATH CHARACTERISTICS

1. *Concentrated Solutions.*

The copper content, 60-90 g/L (8-12 oz./gal.), and the corresponding cyanide content, 138.75-207.9 g/L (18.5-27.7 oz./gal.), of the high speed commercial solutions are 2 to 4 times greater than in the older processes.

2. *High Alkalinity.*

This is higher than general, from 15-45 g/L (2-6 oz./gal.) (as NaOH?) and is kept fairly high by additions of Caustic Soda.

3. *Wetting Agents.*

These are used to prevent pitting, are necessary because the solution operates at 100% efficiency at the cathode. By lowering the surface tension of the solution, there is little or no tendency for foreign material to adhere and cause roughness or pits.

4. *Addition Agents.*

Besides preventing roughness, the addition agents are useful in production of bright, uniformly colored deposits and in widening the bright range.

5. *High Temperature.*

The preferred operating temperatures are between 158°-186°F. (70°-80°C.). Hot solutions, although in use with some older processes, had very low efficiencies, and required a hood because they were generally accompanied by excessive cyanide decomposition, giving rise to noxious fumes.

6. *High Anode and Cathode Efficiency.*

Results are satisfactory only at about 100% anode and cathode efficiency. By observing this condition there will be no hydrogen at the cathode to cause burning, no evolution of noxious fumes nor should there be any oxygen at the anode to bring about insulation and the excessive cyanide decomposition which was characteristic in the operation of many of the older solutions.

7. *High Purity Anodes.*

Special high purity anodes are used because they are free from the impurities present in the ordinary rolled, cast or scrap copper anode which causes polarization at high current density—20 to 40 A/SF.

8. *Cathode Agitation.*

Uniform cathode agitation is necessary for the high current densities. This is necessary, for rapid plating, to prevent depletion at the cathode film. The rate of deposition, within certain limits, is proportionate to the speed of agitation.

9. *Bath Cleanliness.*

A clean bath, obtained through continuous or intermittent filtration, depending on conditions, is essential to prevent roughness. Any metallic particles, unless removed, may lodge on the cathode surface and cause roughness.

10. *Simple Bath Control.*

Control of the bath is easy, for the purpose of each ingredient is known. The observations below will be useful:

(a) The metal content may vary widely provided the "Free Cyanide" is carefully regulated. This is one of the most important factors in control, hence frequent titrations should be made to accurately control the "Free Cyanide".

(b) Addition Agents do not deteriorate in use or on long standing. The bath does not suffer from being inactive.

(c) Small amounts of impurities which may get into a commercially operated solution are not harmful.

(d) Cleanliness is important. Filtration or decantation should be practiced whenever necessary.

(e) Any temperature within the permissible range may be used but it should accurately regulate within a few degrees of the selected point.

(f) Cathode current density may vary widely, depending on the type of work being plated, but once selected should be controlled closely. Permissible current densities vary considerably and depend on how fast the natural depletion of the cathode film is corrected by moving the cathode. Average commercial current densities are 20-60 A/SF at the cathode. Articles which permit rapid agitation, such as rolls or round wire, may be plated at 100 to 150 A/SF.

The anode generally permits current densities not in excess of 40 A/SF.

EXPERIMENTAL DEVELOPMENT

Formulae in use for commercial copper plating at the time this study was started were employed as a basis for this experimental work. The effect of the various factors on the characteristics of the bath and deposit are given in detail in the following tables.

I. Effect on Change in Current Density on the Efficiency of Solutions Varying in Composition

	Sol. No. 1	*Sol. No.* 2
Cu as metal	15.9 g/L-2.13 oz./gal.	31.9 g/L-4.26 oz./gal.
Cu CN	22.5 g/L-3.0 oz./gal.	45.0 g/L-6.0 oz./gal.
NaCN	30.0 g/L-4.0 oz./gal.	51.5 g/L-7.0 oz./gal.
Soda Ash	15.0 g/L-2.0 oz./gal.	15.0 g/L-2.0 oz./gal.

Operating Conditions.

Temperature—30°C.—86°F.

Anodes—Cathode Copper.

Ratio anode to Cathode—3 to 1.

Cathode current density—10-100 A/SF.

Procedure.

The solutions in this and other experiments were electrolyzed in series with a copper coulometer. "Free cyanide" was adjusted to original value by analysis after each run so as to remove insistencies which might be caused by fluctuation in the "free cyanide" content.

Results.

Run No.	*Cathode Current Density*	*Cathode Efficiency Sol. No.* 1	*Sol. No.* 2
1	10 A/SF	57.1%	79.7%
2	25 A/SF	31.3%	50.1%
3	40 A/SF	24.4%	44.3%
4	60 A/SF	19.1%	35.0%
5	100 A/SF	15.7%	30.6%

Conclusions.

1. Cathode efficiency is inversely proportional to Cathode Current Density.

2. Doubling the concentration increases the overall cathode efficiency by approximately 20%.

II. EFFECT OF TEMPERATURE CHANGES ON CURRENT EFFICIENCIES

Procedure.

Solutions No. 1 and 2 (see Table 2) were electrolyzed and the current efficiencies determined at 20°, 30°, 40°, 50° and 60°C. respectively.

Operating Conditions.

Anode—Cathode Copper.
Ratio of Anode to Cathode Area—3 to 1.
Cathode Current Density—25 A/SF.
Time of Deposits—1 hr.

Results.

TABLE 2

Run No.	*Temp.*	*Cathode Efficiency Sol. No. 1*	*Sol. No. 2*
1. Checked	20°C.	21.4%	46.1%
2. Checked	30°C.	31.2%	60.5%
3. Checked	40°C.	41.5%	63.8%
4. Checked	50°C.	49.5%	76.0%
5. Checked	60°C.	64.2%	83.7%

Conclusions.

1. An increase in temperature of 10°C. effects an increase in efficiency of approximately (8%) (10.2% and 9.4% respectively).

2. Current efficiency of Solution No. 2 was about 20% greater than Solution No. 1 at all the different temperatures.

III. CURRENT EFFICIENCY AT 30°C. OF SOLUTIONS VARYING IN COMPOSITION

Procedure.

Five solutions, widely varying in composition, were electrolyzed under operating conditions identical to Experiment I and II, except that a 30°C. temperature was maintained throughout. The solution compositions are given in Table 3 and the current efficiency in Table 3A.

TABLE 3

Bath Composition	*Sol. No. 1*	*Sol. No. 2*	*Sol. No. 3*	*Sol. No. 4*	*Sol. No. 5*
Cu (Metal)	15.9 g/L	31.8 g/L	47.7 g/L	74.5 g/L	101 g/L
CuCN	22.5 g/L	45.0 g/L	67.5 g/L	105 g/L	142.5 g/L
Sodium Cyanide	30.0 g/L	51.5 g/L	75.0 g/L	112.5 g/L	150.0 g/L
Soda Ash	15.0 g/L	15.0 g/L	15.0 g/L	15.0 g/L	15.0 g/L
"Free Cyanide"		4.5 to 7.5 g/L			

TABLE 3A
Efficiency at Varying Current

10 A/SF	57%	80%	90%	92%	97%
25 A/SF	31%	50%	73%	85%	95%
40 A/SF	24%	44%	58%	71%	88%
60 A/SF	19%	35%	45%	58%	75%
100 A/SF	15%	30%	36%	47%	66%

Conclusions.

High concentrations are essential for high efficiencies at high current density.

Remarks.

Dr. L. C. Pan in his paper on "Concentration of Copper Plating Sols" (*Metal Cleaning and Finishing*, 1935), maintained "Both anode and cathode efficiencies rise rapidly with the copper content of the bath". The above results show this quite definitely. But he was wrong in his conclusion that "Cathode current efficiency shows a maximum value at a copper concentration of 63.75 g/L (8.5 oz./gal.)." This was only the result of maintaining a molal ratio of copper to free cyanide of 0.29. Thus the free cyanide of the more concentrated sols was considerably higher than for dilute solutions, and the cathode efficiency did not increase in the same proportion as when the free cyanide was kept constant.

IV. EFFECT OF INCREASE OF FREE CYANIDE ON ANODE AND CATHODE EFFICIENCIES

Solution Composition.

	Sol. No. 6	*Sol. No. 7*
Copper as metal	45 g/L	142.5 g/L
"Free" Sodium Cyanide	1.8 g/L	2.0 g/L
Soda Ash	15 g/L	15 g/L

Operating Conditions.

Temperature—30°C. (86°F.).
Anode Current Density—8 A/SF.
Cathode Current Density—20 A/SF.
Time of runs—1 hr.

TABLE 4

Free NaCN g/L		Sol. No. 6		Sol. No. 7	
Sol. No. 6	Sol. No. 7	% Cath. Eff.	% Anode Eff.	% Cath. Eff.	% Anode Eff.
1.9	2.0	72.4	39.5	96.3	65.8
5.4	5.0	61.6	102	94	106
12.7	15.0	52	104	91	103
19.5	20.0	41	108	92	100
27.7	28.5	28.5	100	88	100
39	41.7	12.7	100	83	101
	70.5			58	103

Conclusions.

1. The effect of increase in free cyanide (is obvious).

2. The best deposits, viz., pink color with good adherence, were obtained in the following free cyanide ranges:

Sol. No. 6—5.4 to 12.7 g/L.

Sol. No. 7—20.0 to 70.5 g/L.

Remarks.

The above experiments were made with the following objectives in mind:

1. High Anode efficiency 90-100%.
2. High Cathode efficiency 90-100%.
3. Smooth deposits for substantial coatings 0.0005 to 0.001".

None of the results up to this point met all of the above requirements.

Experiments on anode efficiency indicated that only 100% efficiency was satisfactory, for if less than 100% anode efficiency is obtained, oxygen is given off and the anode becomes polarized. Polarization may be of a varying intensity. In severe cases the anode may become completely insulated and the efficiency is zero (0) or thereabouts. In mild cases the efficiency will fluctuate widely with the degree of polarization. It is thus evident that conditions which cause even only a slight degree of polarization are objectionable because at any given voltage, cathode current densities fluctuate and maintenance of constant current is difficult or impossible. Further, oxygen at the anode is a potent factor in decomposing cyanide with the resultant formation of volatile ammonia cyanide and building up carbonate.

Cathode efficiency determinations showed that high efficiency (90 to 100%) could not be obtained from cold solutions (30°C.) except at a fairly low cathode current density—20 to 30 A/SF.

Not much attention was given to character of the deposit, for the main object was to determine the conditions under which heavy coatings could be obtained in a short time from a balanced solution. In was noted, however, that there was a general tendency toward roughness on deposits exceeding a thickness of 0.0003″-0.0004″. This led to further experimentation with solutions at higher temperature.

V. ANODE-CATHODE EFFICIENCY TESTS AT ELEVATED TEMPERATURES

Solution Composition	*Sol. No.* 8	*Sol. No.* 9	*Sol. No.* 10
Copper Cyanide	45 g/L	97.5 g/L	135 g/L
Sodium Cyanide	60 g/L	97.5 g/L	148 g/L

Operation Conditions.

Anodes—Cathode Copper.
Ratio Anode to Cathode Area—2 to 1.
Temperature—50°-75°-90°C.
Time of Deposits—2 hours.
Cathode Current Density—20-100 A/SF.

TABLE 5—Results at 50°C.

	Sol. No. 1-(8)	*Sol. No.* 2-(9)	*Sol. No.* 3-(10)
Amperage at Cathode	24 A/SF	25 A/SF	26 A/SF
Cathode Efficiency	73.9%	96.4%	85.9%
Anode Efficiency	105%	98.7%	99.5%
Amperage at Cathode	32 A/SF	40 A/SF	50 A/SF
Cathode Efficiency	34.3%	53%	74.8%
Anode Efficiency	33.9%	100%	57.0%
Amperage at Cathode		50 A/SF	90 A/SF
Cathode Efficiency		77%	67.8%
Anode Efficiency		66.7%	57.7%

TABLE 6—Results at 75°C.

	Sol. No. 1-(8)	*Sol. No.* 2-(9)	*Sol. No.* 3-(10)
Amperage at Cathode	25 A/SF	25 A/SF	25 A/SF
Cathode Efficiency	89.5%	97.6%	96.7%
Anode Efficiency	104%	100%	100%
Amperage at Cathode	50 A/SF	48 A/SF	50 A/SF
Cathode Efficiency	61.5%	96.2%	78.2%
Anode Efficiency	77.3%	104%	75.4%
Amperage at Cathode	100 A/SF	76 A/SF	96 A/SF
Cathode Efficiency	47.4%	88.6%	72.4%
Anode Efficiency	41.8%	85.0%	58.1%

TABLE 7—Results at 90°C.

	Sol. No. 1–(8)	*Sol. No.* 2–(9)	*Sol. No.* 3–(10)
Amperage at Cathode	28 A/SF	26 A/SF	50 A/SF
Cathode Efficiency	95.5%	100%	98.8%
Anode Efficiency	102%	103%	103%
Amperage at Cathode	50 A/SF	50 A/SF	98 A/SF
Cathode Efficiency	90%	96%	88.4%
Anode Efficiency	100%	99%	98%

Conclusions.

1. The average cathode efficiencies of cathode current densities between 25-100 A/SF of all the solutions was

72% at 50°C.

86% at 75°C.

90% at 90°C.

2. At elevated current densities, anode current densities of 50 A/SF may be used, at the same time maintaining 100% efficiency.

3. To maintain balanced anode and cathode efficiencies at high current densities, it is necessary to operate hot concentration solutions.

VI. ANODE PASSIVITY

Experiments were conducted to determine the exact conditions under which satisfactory anode corrosion could be obtained.

Procedure.

The plating baths (2 L Solutions) were connected in series with an ammeter and in parallel with a voltmeter. Electrolysis was carried out at 30°, 60°, and 90°C. Anodes were pure copper, 3″ x 3″ x ½″ thick. Cathodes were 3″ x 3″. A cathode was hung between two anodes. Ten-minute electrolysis periods were carried out with each solution and a record made of the amperage and voltage rise at which the anodes remained clean and became passive.

Sol. Composition	*Sol. No.* 11	*Sol. No.* 16
CuCN	45 g/L	135 g/L
NaCN	60 g/L	170 g/L
Na_2CO_3	30 g/L	

Results

TABLE 8—Sol. No. 11—Temp. 30°C.

	Volts	*Amps.*	*Amp. I/F*	*Remarks*
Start	2.1 V.	4.2	16.8	Anodes coated over in 1 min. and
Finish	4.5	4.2		voltage rose to 4.5 V.
Start	1.9 V.	3.1	12.4	Anodes coated 1 min.
Finish	4.0	3.1		Green salt formed.
Start	1.6	2.1	8.4	Anodes filmed 2 min.
Finish	3.8	2.1		No salt formed.

When the current was turned on, a record was made of the voltage drop and voltage rise. At 16.8-12.2 A/SF, anodes insulated readily and quickly and green salt was formed—a decidedly unsatisfactory condition. It was only at 8.4 A/SF that satisfactory results were obtained, hence the assumption that 8.4 A/SF was the maximum permissible current for satisfactory anode corrosion in such a solution. Since a cathode was hung between two anodes it must be noted that the figures given for anode current densities are not exact, for there was no way of determining just how much current went to the back of the anode. The idea was to simulate actual plating conditions as closely as possible.

TABLE 9—Sol. No. 16—Temp. 90°C.

	Volts	*Amps.*	*Amps./SF*	*Remarks*
Start	1.7	14.1	56.4	Anodes perfectly clean.
Finish	1.9	14.1	56.4	
Start	1.2	8.0	32.0	Anodes perfectly clean.
Finish	1.4	8.0	32.0	
Start	0.7	4.5	18.0	Anodes perfectly clean.
Finish	1.0	4.5	18.0	

Explanation.

Under the above conditions no passivity or voltage rise was observed even at 50 A/SF.

TABLE 10—General Results

Sol. No.	11	12	13	14	15	16
CuCN g/L	45	90	98	135	135	135
NaCN g/L	60	98	98	147	147	170
Na_2CO_3 g/L	30				60	
Passivity at 30°C. at	8 A/SF	24 A/SF	12 A/SF	24 A/SF	9 A/SF	24 A/SF
No passivity at		20 A/SF	8 A/SF	12 A/SF		12 A/SF
Passivity at 60°C.	24 A/SF	56 A/SF	32 A/SF	40 A/SF	24 A/SF	56 A/SF
No Passivity at	16 A/SF	40 A/SF	24 A/SF	24 A/SF	9 A/SF	32 A/SF
Passivity at 90°C.	56 A/SF	60 A/SF	48 A/SF		56 A/SF	
No Passivity at	40 A/SF	40 A/SF	36 A/SF	56 A/SF	40 A/SF	56 A/SF

Conclusions.

1. Maximum current densities permissible for rather concentrated solutions at various temperatures are:

8 to 25 A/SF at 30°C.
9 to 56 A/SF at 60°C.
36 to 56 A/SF at 90°C.

Temperature of solution is of great importance, and for general purposes the best results can be obtained at solution temperatures in excess of 60°C.

2. High carbonate content has a very bad effect at low temperature (30°C.). At high temperature the effect is practically negligible, although noticeable.

3. Change in cyanide content has a greater effect at low temperature than at high temperature. (Compare solutions 12 and 13 at 30°C. and 90°C.)

4. Change in overall concentration of solution has an effect. (Note solutions 12 and 16 at 30-60-90°C.)

VII. EFFECT OF CARBONATE

Experiments listed under Table No. 10 showed that carbonates affected anode corrosion, so further efficiency experiments were made on sols. 11, 12, 13, 14, 15 and 16, to which was added up to 9 oz./gal. of anhydrous sodium carbonate.

These experiments were carried out at 75°C. because data were already available for low temperature solutions.

Conclusions.

Fairly large amounts of carbonate, 9 oz./gal. or more, have no appreciable effect on anode and cathode efficiency in high temperature solutions.

VIII. EFFECT OF NaCL, Na_2SO_4, NaS_2O_3 ON ANODE AND CATHODE EFFICIENCIES OF HIGH TEMPERATURE SOLUTIONS

These materials are said to be detrimental in low temperature solutions. Their effect in high temperature solutions on anode and cathode efficiency was studied and results given below:

Sol. Comp.	*Operating Condition*
CuCN—90 g/L	Anodes: Cath. copper.
NaCN—98 g/L	Ratio anode to cathode area—2 to 1.
	Temp. Sol.—80°C.
	Cath. Curr. Density—50 A/SF.
	Anode Curr. Density—25 A/SF.

Results.

TABLE 11

g./L. Added	*Cath. Eff.*	*Anode Eff.*
NaOH	94.0%	97.9%
NaOH—7.5 g/L	95.3%	100.7%
NaOH—15.0 g/L	95.5%	101.3%
NaOH—30 g/L	97.7%	98.9%
NaOH—60 g/L	97.2%	1.93%
NaCl—30 g/L	92.6%	105.0%
NaCl—60 g/L	92.0%	95.0%
$Na_2SO_4.10H_2O$—41 g/L	94.8%	100.0%
$Na_2SO_4.10H_2O$—82 g/L	93.3%	98.9%
Na_2SO_3Anhyd.—30 g/L	93.4%	91.8%
Na_2SO_3Anhyd.—67.5 g/L	92.1%	101.0%
Na_2SO_3Anhyd.—90 g/L	92.0%	36.0%

Conclusions.

With the completion of the above experiments, sufficient data were now available for the development of a practical process for High Speed plating, viz., a balanced solution for general purposes in which the high anode and cathode efficiency could be maintained at high current densities. The solution composition and operating conditions were:

Sol. Comp.
CuCN—12.0-18.0 oz./gal.
NaCN—13.0-19.5 oz./gal.

Operating Conditions.
Anodes—Pure Copper.
Anode Curr. Density—up to 40 A/SF.
Anode Eff.—100%.
Cath. Curr. Density—10-100 A/SF.
Cath. Efficiency—90-100%.
Temp. of Sol.—70°-90°.
Time required to deposit 0.001″—6.0-12.0 min.

IX. PRODUCTION OF BRIGHT DEPOSITS

There was still the problem of getting suitable deposits, i.e., coatings of good appearance which were uniform and fine grained. Even in the laboratory, it was difficult to get deposits thicker than 0.0003″ which would be suitable for direct nickel plating, chiefly because of roughness. Nevertheless, excellent deposits were produced at current densities under 15 A/SF or in excess of 60 A/SF. Several hundred different addition agents were tried with very little success, the following being typical.

Sodium bisulfite	Definite beneficial effect.
Hypo	Beneficial in very small amounts for light not coatings only.
Glue	No apparent effect.
Dextrose	No effect.
Sodium Arsenate	No effect.
Sodium Propiolate	Slightly beneficial.
Furfural	No effect.
Rochelle Salts	Slightly beneficial.
Sodium sulfide	Beneficial in extremely small units.
Lead Acetate	No beneficial effect in small units. Large units very detrimental.

Little progress was made until it was discovered that very fine deposits could be produced by frequent removal of the work from the solution and momentary exposure to air. Air exposure seemed to work, so experiments were made with oxidizing agents until it was found that the brightening phenomena had no relationship to air exposure but was due to the agitation in removal from the solution. Just about that time, it was determined that the copper cyanide solution had a very narrow bright plating range providing deposits were produced at 100% cathode efficiency. Further experiments showed that one of the main factors in producing bright deposits was this 100% efficiency at the cathode. Evolution of hydrogen produced burning regardless of the presence of addition agents, but these agents were useful in increasing the normal bright range of the solution to make it satisfactory for commercial purposes.

X. IMPROVING PHYSICAL CHARACTERISTICS

Now that it was possible to produce bright deposits, other serious problems developed, viz., roughness and pitting. Constant filtration was no help for pitting and roughness are caused not only by foreign particles but also by a peculiar characteristic of the solution itself.

Wetting agents were tried and without success. In fact, many wetting agents, even in a filtered solution, tend to increase the pitting. Finally, the product was found which is now being used commercially, and which definitely prevents pitting. It can be readily controlled by surface tension measurement. For general purposes, however, excellent results can be produced through filtration or settling and a wetting agent. And an addition agent has been developed which tends to eliminate roughness where filtration facilities are lacking.

Purifying Bright Nickel Solution

By EDMUND S. JEVELI

A. S. Campbell Company

Read at the Boston Branch Meeting

WITH the advent of bright nickel, solution purification has become of extreme importance. These solutions are operated at high temperatures up to 140° F., with current densities as high as 40 amps per sq. foot and are agitated. Under these conditions, suspended matter can become a headache of the first order. In the old days with the cold nickel solutions it was a rare occasion when the nickel solution was filtered.

A short time ago I was down in North Attleboro, when I was shown a cold nickel solution that had been in operation for ten years without being filtered. I admit it was a fairly deep tank, but I would hate to stir it up. When a solution is heated convection currents tend to keep foreign matter in suspension. Agitation also brings on this condition. As we all know suspended matter can cause roughness which will certainly destroy the utility of bright nickel but more than this roughness, pitting and poor corrosion resistance are all tied up. Dirty solutions will pit whereas clean ones will not. The only exception to this that I have come across in my experience was where some frozen non-pitter was added to a clean solution. The solution began to pit and the more non-pitter the plater added, the more the solution pitted. It was a strange occurrence, but something to remember. Inclusions in the plate such as iron hydrate, sludge and organic matter definitely reduce corrosion resistance. It isn't enough to just plate .001" of nickel since if we have a nodurlized deposit, where buffed the nodules may be broken off resulting in holes in the plate. The rust resistance of such a plate will be no better than the weakest point. Therefore, we can see the importance of filtration in bright nickel. It is possible to either provide continuous filtration or to filter the solution into a storage tank at specified intervals. There are different methods of filtering using different types of filters. The plate and frame filter press seems most adaptable to filtering bright nickel solutions. With such a press it is easy to build up a cake of filtercel and activated charcoal on the plates which can be used to remove organic impurities along with suspended matter.

The filter press consists of a strong iron frame on which are assembled alternate frames and cloth covered plates. For bright nickel solutions the frames and plates can be made of lead or hard rubber. The plates and frames are closed and held together by means of a follower pushed by a screw and rachet gear wheel, making a series of closed chambers. The solution to be filtered is pumped thru these chambers by either a centrifugal or diaphragm pump. The solution flows into all the chambers simultaneously. The solid matter being retained on the cloths and the clear solution exiting at the discharge end. In the treatment of bright nickel solution filter-cel, and activated charcoal are used. The filter press is first filled with clean water which is pumped continuously while the filter material is being prepared. A pre-coat of filter-aid is first applied. The amount of filter-aid to use depends upon the plate area, approximately 10 lbs. of Hy-flo-super-cel per 100 sq. ft. The filter-cel is mixed with water in a barrel, this is then circulated thru the pump, being careful to keep both ends of the hose in the barrel so as not to lose any of the filter-cel. When the filtrate is clear add 20 lbs. of activated carbon and 10 lbs. filter-cel for each 100 sq.ft. of filter plate area to the barrel and circulate thru the pump until all the charcoal has been picked up and the solution is clear at the discharge.

The filter press should be kept under pressure until the intake can be placed in the nickel solution. 5 lbs. of charcoal per 1000 gallons will take care of the average amount of contamination. When a large amount of buffing compounds and oil has been allowed to get into the solution as much as twenty lbs. of activated charcoal may be necessary.

Unless the press is a large one, it will require cleaning and re-packing, with these materials several times for large volumes of plating solutions. If only a small press is available it is better to filter the solution into a storage tank then add the activated charcoal directly to the solution in the storage tank, stir and allow to settle over nite. Then filter back into the plating tank being careful to draw solution from the top so as not to carry over too large an amount of charcoal which might clog the press and make necessary repeated cleaning.

Filtration using activated charcoal will take care of suspended

matter, lubricating oils, broken down brightener and other colloidal organic matter. Occasionally it may be desirable to filter the bright nickel solution at a high pH to remove iron and other impurities. This can be done in conjunction with the removal of organic impurities. The solution is filtered into a storage tank as in the previous method, charcoal is added at the rate of 5 lbs. per 1000 gal., then add 1 to 1½ lbs. of nickel carbonate for each 100 gallons of plating solution. The dry nickel carbonate should not be added direct but first made into a paste or slurry with water and then well stirred in the solution. If it is necessary to remove only iron a pH of between 4.5-5.0 electrometic is sufficient. If the solution is contaminated with zinc the pH must be raised to 6.8 electrometic. To raise the pH to 6.8 would require a large amount of nickel carbonate and the procedure would be slow. It is better to bring the pH to 5 with nickel carbonate and then add lime to obtain a pH of 6.8.

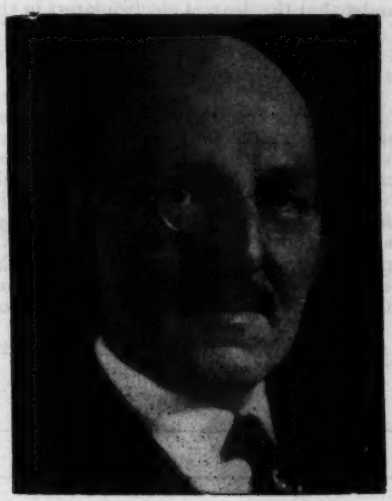
This purification method will take care of organic impurities, iron, zinc and aluminum. None of these methods will remove copper. In certain bright nickels copper can cause trouble, since it plates out in low current density areas, resulting in a dark plate at these points. It also has a detrimental effect on both the throwing power of the nickel bath and on the throwing power in the subsequent chrome plating operation. There are two methods for the removal of copper from a bright nickel bath, one can be combined with the precipitation method just outlined for the removal of iron. The usual procedure is followed whereby the solution is filtered into the storage tank, charcoal is added, then iron powder (reduced by hydrogen) is added. The solution is stirred well for 15 minutes. The copper is removed by cementation. The pH is then raised to remove iron as in the previous methods. The subsequent steps remaining the same.

The other method for the removal of copper is the electrolytic method. Copper can be plated out at a low pH and low current density using agitation. The pH should be lowered to between 1-1.5. Dummy the solution and operate with agitation at a c.c. of approx. 5 amps./sq. ft. The current should be broken at frequent intervals, allowing some of the copper to immerse out.

By the use of these methods most of the trouble-making impurities in bright nickel solutions can be removed.

GOOD FELLOWSHIP — THE "SCOUTS"

George A. Hogaboom



The value of any article or any organization cannot become generally known unless it is advertised. Sometimes it is not advisable to use blazing headlines as the impression may be created that an overstatement is being made. In building up an organization regardless of the advantages it may offer the best kind of advertising is done by personal contact. When the object of the organization, the type of men that are invited to become members, the ultimate aim in holding meetings and the benefits to be derived are told by a man in whom other men have confidence, then the growth of a movement is assured.

The National Electroplaters' Society, from which the American Electroplaters' Society grew, was most fortunate in having men who, although they were denied full membership and the right to hold office, believed in the aims of the newly organized society—the education of the members in the art of electroplating and the finishing of metals. The belief of these men in the good that would result for their friends and associates became a sort of religion to them. They told the story over and over again. Each day in their travels their "one good deed" seemed to be to interest some plater in becoming a member of the organization that would bring them into closer contact with those who were interested in the same things as themselves; an assembly of men whose sole object was to make each other a better workman by increasing their store of knowledge;

and, more than that, by increasing their happiness in life by being strengthened in their knowledge of the fundamental principles of their vocation.

Is it any wonder that the dean of electroplaters in the middle West the late "Ed" Willmore called these men the "Scouts" of the A.E.S.? A well chosen cognomen and one that is richly deserved. One that is still in force 100%.

As the A.E.S. grew the number of "Scouts" increased and while the building up of the membership was not forgotten it was felt by men like Wilfred McKeon and Frank Clark that they should have an organization of their own. Sound a good bugle call to a group of "Scouts" and all will respond. The response to this call was the Good Fellowship Club—a fitting climax to their original object in getting platers together to become better platers. Now, to add to their enjoyment in life, to give a happy impetus to the annual conventions of the A.E.S., to create and foster during conventions and at all times "Good Fellowship". What an object for "Scouts"!

The A.E.S. is appreciative but can never repay in full the good works of the "Scouts".

MILWAUKEE BRANCH

of the A. E. S. extends a cordial invitation to you and your friends to attend our

Annual Educational Meeting and Banquet

on **Saturday, April 29th** at the **Schroeder Hotel,** 5th & Wisconsin Ave., Milwaukee, Wisconsin. An excellent program has been prepared and is ready for your attention. The papers will be presented by the leading prominent men in their field. The educational program will be announced later and the same will be held in the Green Room at 2 p. m.

The banquet will be held in the Crystal Ball Room at 7 p. m. Tickets for the banquet will be $3.00 per person. Membership is not necessary to attend either function.

SPECIAL NOTICE

Heinie and his Grenadiers, the outstanding feature of the late Milwaukee Convention will entertain.

Yours truly,

The Committee

Membership Campaign

March 1, 1939

Branch	Elected	Reinstated
Detroit	61	4
St. Louis	31	
Philadelphia	29	2
Chicago	28	
Grand Rapids	27	2
Buffalo	20	
New Haven	20	
Cleveland	17	
Newark	16	1
Toronto	11	1
New York	10	4
Dayton	9	1
Milwaukee	9	
Bridgeport	8	
Los Angeles	8	
San Francisco	6	
Boston	5	1
Hartford	5	
Toledo	3	
Springfield	2	1
Binghamton-Syracuse	2	
Rochester	2	
Waterbury	2	
Pittsburgh	1	1
Anderson	1	
Cincinnati	1	
Providence-Attleboro		1
Baltimore-Washington		
Montreal		

Business and Social News

BRANCH NEWS

Educational Activities

SPRINGFIELD BRANCH

The Springfield Branch held its regular monthly meeting with the Hartford Branch at the State Trade School in New Britain, Conn., on Monday night. January 16th at 8 p.m. The attendance was most commendable, about 80 members and guests being present.

Mr. Frederick Fulforth, Supervisor of Finishing at the Proctor Electric Co. in Philadelphia, Pa., was the speaker. His subject was "The Selection of Steel for Plating and Finishing".

Mr. Fulforth explained the use and advantages of the new high-finished steel, emphasized its use in reducing plating-room costs. He explained that in using it the supervisor must know what to specify as to grain size, cover paper, oil or lubricant, and finish. The savings possible from its use are roughly equivalent to the difference between the buffing and polishing costs of the finished article.

The following questions were asked:

Q. How are stains on bright nickel eliminated?

A. We dip the plated pieces in a hot alkaline cleaner before the final rinsing and drying.

Q. Do you recommend a copper flash on cold rolled steel before bright nickel plating?

A. If a copper flash can be eliminated on any steel before the subsequent nickel plating the corrosion resistance of that piece will be greatly increased.

The talk and discussion were thoroughly enjoyed by all and Mr. Fulforth was given a rising vote of thanks.

The meeting was adjourned at 10:30.

D. S. HARTSHORN, JR., *Sec.*

WATERBURY BRANCH

The regular meeting of the Waterbury Branch was changed from Friday to Wednesday, February 8th.

The regular speaker was Mr. Louis F. Loutrel of the Monsanto Chemical Company, who talked on "The Use of Ferric Sulphate in the Pickling of Copper Alloys". He traced the development of this material as a pickling agent and gave a theoretical and practical discussion of its use. Considerable discussion was aroused as this is a relatively new material for this type of use. It was interesting to learn that various pickles such as bright dips, bright chromate dips and ferric sulphate dips, although they accomplish approximately the same thing, all give a different color to the metal. Therefore, various parts to be used near one another couldn't be pickled by different means.

We also had the Supreme President of the Society, Mr. William Phillips, who showed a moving picture on the "Finishing of a Radiator Grille". This also aroused considerable discussion and favorable comment. All were particularly interested to notice that colored photography showed the difference between the color of the die casting, the nickel plated die casting and the chrome plated die casting. This could be seen in the still pictures as well as in the moving pictures.

In addition to the Supreme President, we also had with us the Executive Secretary, Mr. W. J. R. Kennedy, and the 3rd Vice-President, Mr. J. L. Downes.

We were able to have photographs

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Please mention THE MONTHLY REVIEW *when writing*

taken of all of the officers at the meeting. E. T. CANDEE, *Sec.*

PITTSBURGH BRANCH

I am enclosing a paper read at our January meeting, by Mr. Loutrel, Jr., of the Monsanto Chemical Co., on the pickling of alloys and stainless steel. Last Friday, February 3rd, we had the pleasure of having George B. Hogaboom present, who spoke on electroplating in general and from the report I received, this meeting was an interesting one, in fact did not close until 11 o'clock. It was necessary for me to be in Harrisburg, Pa., that evening, so missed a good meeting and sorry not to have the pleasure of seeing my old friend.

Our next meeting will be in charge of Mr. E. C. Fridel, of the duPont Co., who will speak on bright copper plating.

I am looking forward to the annual convention, and from what I have heard, expect that Pittsburgh Branch will be well represented.

S. E. HEDDEN, *Sec.-Treas.*

BUFFALO BRANCH

The regular meeting of the Buffalo Branch was held at the Stratford Arms Hotel, Friday, January 20th, The meeting was called to order by our President, Mr. Joseph Ruff, and the minutes were approved as read.

Mr. J. Post graciously accepted the chairmanship of the Membership Committee recently left vacant by the resignation of Mr. Repley.

A very comprehensive course covering plating and its various problems, analysis of solutions, elementary chemistry and its practical application to modern plating has recently been inaugurated. It is conducted by Mr. Harvey Slatin, head chemist of Trico Products Corp., and the appreciation and enthusiasm shown by its members is most encouraging for the Branch as a whole.

The regular business of the meeting was concluded by Mr. Wm. "Cyanide Bill" Schneider of the R. & H. Co., of Niagara Falls, one of the real old time platers who gave his address on "Bright Copper Plating". With his vast experience, Bill was able to give a most interesting talk interspersed with humorous stories about difficulties which beset Die-Cast Plating in its infancy, and explained that had it not been for the close co-operation of the chemists and platers it would not occupy the position in the plating industry which it now holds.

He also spoke briefly on the merits and woes of "High Speed Copper Plating Salts", a recent development by Mr. Floyd Oplinger of his company. His talk being of a non-technical nature was greatly appreciated by the practical members of the Branch. A lively discussion followed during which Bill gave an excellent account of himself in answering a wide range of questions. He was given a rising vote of thanks.

The meeting then adjourned at eleven p.m. after a very enjoyable and instructive evening.

R. MCGHEE, *Librarian*

The regular meeting of the Buffalo Branch was held on February 17 at the Stratford Arms Hotel with President Ruff in the chair.

Mr. Slatin, our energetic electroplating instructor, reported that the weekly electroplating classes at Canasius College have shown a very gratifying attendance of fifteen or more which speaks for itself.

After a brief business session, our guest speaker, Mr. Raymond F. Yates, vice-president of Krome-Alume, Inc., described "The Nickel Plating of Alum-

inum and Aluminum Alloys" by the Travers process.

The novel features of the process consist in anodizing the aluminum in oxalic acid at 50 volts A.C. and then partially breaking down the resulting oxide film in a sodium cyanide solution just prior to nickel plating. The nickel coatings penetrate and bridge this film producing remarkably adherent coatings which can be bent, soldered, drawn, buffed or chrome plated. Any good dull or bright nickel solution may be used. Beautifully nickel-chrome plated aluminum articles such as a radio condenser, a water pitcher, pistons, moldings, tubes, flat iron bottom and other gadgets were exhibited.

It is not often that we can learn about a new plating process at first hand and every member present took back valuable information to his employer and associates.

C. J. WERNLUND

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LOS ANGELES BRANCH

The Los Angeles Branch of the American Electroplaters' Society held its regular monthly meeting February 8, 1939, at the Rosslyn Hotel.

President Earl Coffin called the meeting to order.

Educational motion pictures, titled "Modern Methods of Manufacturing," were supplied by the Board of Education and shown by Tony Vasquez.

M. D. Rynkofs outlined a program for the research committee and asked that members co-operate with the committee in preparing a specimen panel for exposure test, that will be inspected periodically here on the Pacific Coast. It was also pointed out the necessity of certain instruments for determining the thickness of the deposits.

President Earl Coffin appointed the following members to assist in this work. Don Bedwell of Hellenscheidt & McDonald Co., Alex. Regmunt of the U. S. Spring & Bumper Co., E. R. Williams of Douglas Aircraft Co., and H. J. Kroesche of the A. J. Lynch Co.

The balance of the evening was spent in discussing plans for our annual educational session which is to be held on March 25, 1939, at the Roosevelt Hotel, Hollywood, California.

Meeting adjourned 11 p.m.

RAYMOND SOLIVAN, *Sec.-Treas.*

CLEVELAND BRANCH

The regular monthly meeting of the Cleveland Branch of the A.E.S. was held Saturday, February 4, 1939, at Hotel Cleveland.

Meeting called to order by our President, Mr. Matts at 8:30.

Minutes were approved as read.

Applications were: Carl H. Shoemaker, Youngstown Sheet & Tube Co., Active; C. Arthur Fullerton, Youngstown Electro Plating Co., Active; Allen G. Larson, Ashtabula Bow Socket Co., Active; Louis C. Sobey, Plating & Galvanizing Co., Active; O. Glenn Cross, Detroit Rex Products Co., Associate; Virgil H. Waite, McGean Chemical Co., Associate; John A. Turk, McGean Chemical Co., Associate; Bernard Martin, McGean Chemical Co., Associate; Frederick T. Buescher, General Supply Co., Associate.

The elections were: John T. Bohovic, Royal Brass Co. of Cleveland, Ohio, Active; Chas. A. Carrick, Cleveland Welding Co. of Cleveland, Ohio, Active; Leland M. Morse, Eton Mfg. Co. of Cleveland, Ohio, Associate; Michael E. Kilroy, Eton Mfg. Co., of Cleveland, Ohio, Associate; Raymond A. Hoffman, E. I. DuPont de Nemours & Co., Associate; Stephen Miller, The Advance Plating Co. of Cleveland, Active; John Medise, Ohio Plating Co., of Cleveland, Ohio, Active; Frank J. Opatrny, F. B. Stevens Co., of Cleveland, Ohio, Associate.

Dinner Dance Committee reports progress.

Mr. Singler was elected to take charge of Cleveland exhibits at convention.

Mr. Sizelove of Frederick Gumm Chemical Co. will be our speaker at March meeting.

Mr. Hull of E. I. DuPont de Nemours & Co. gave a very good talk on testing coating of the "Drop Test". Meeting adjourned at 10:30.

CHAS. F. OTT, *Sec.*

ROCHESTER BRANCH

The Rochester Branch held its regular monthly meeting one week earlier in February, that is on Friday night Feb. 10, in order to avail ourselves of the opportunity to hear Mr. W. M. Phillips, Chief Research Chemist, of the General Motors Co., in an address, illustrated by a film and slides in Technicolor, entitled "The Story of A Grill".

The platers and chemists and their friends, of Rochester, turned out in a very pleasing manner and gave Mr. Phillips a very attentive and interested audience.

The address was a most interesting one and the questions after it sure kept our speaker busy for quite some time.

The Rochester Branch is indeed indebted to both Mr. Phillips and the General Motors Co. for a very helpful evening. Thanks Mr. Phillips. Come again soon.

Regular business was dispensed with at this meeting with the excep-

tion of the reading of the application to become an associate member, of Mr. John Q. Adams, 751 Jefferson Ave., Rochester, N. Y. This application was read and ordered published.

JUDSON R. ELSTER, *Sec.*

DETROIT BRANCH

Feb. 3, 1939

Q. What would be the advantage of a tungsten plate compared with the now used chromium plate?

A. The inactivity of metallic tungsten toward acids and salts will be the chief advantage.

Q. Can anyone present explain the "Aluminum Anodizing Process"? Are there any Detroit Branch members using this process? Any information on this subject will be appreciated.

A. Aluminum anodizing consists of the formation of an aluminum oxide film on aluminum articles by treating anodically in a suitable electrolite. For specific information on this subject the Aluminum Company of America should be consulted.

Q. What treatment is given to brass or copper prior to plating in order that the deposit may be easily peeled off for testing purposes? Can this same treatment be used on iron or steel?

A. Several methods were suggested, such as dipping in a chromium plating solution and rinsing thoroughly, painting with potassium dichromate solution and rinsing thoroughly, or wiping with a cloth barely moistened with kerosene or some similar substance which will form an extremely thin oily film on the article.

For treating steel, an immersion deposit of copper has been successfully used for this purpose.

Q. What is considered the minimum thickness of copper plate which may be used for selective carburizing?

A. The thickness of copper plate is somewhat dependent on the depth of case to be formed, but the concensus of opinion is that .0005" of a non-porous deposit will be satisfactory for most purposes.

Q. Do you approve of the use of lead as a brightener in a copper plating solution used for plating zinc base die-castings? Are there any harmful effects?

A. A rather lively debate resulted from this question, all parties agreeing that lead was a good brightener if properly controlled but some insisted that proper control was not practicable. Others have been using lead as a copper brightener for many years with excellent results and very little trouble. Among difficulties encountered, were low efficiency caused by excessive additions and deposition of lead by immersion on copper anodes and subsequent roughness of deposit.

Q. How is copper removed from a

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contaminated bright nickel solution? How is iron removed?

A. Plating on dummies at 1 to 2 amperes per square foot at a low pH and a temperature of 125 degrees was suggested for removing copper, and precipitation by raising the pH for removing iron. It was pointed out, however, that procedures may differ in the various proprietary solutions and that the vendor of the solution in question should be consulted.

Q. Is there now on the market proved barrel plating equipment for the new bright copper solution?

A. It had already been pointed out in the talk of the evening that a thorough investigation of this question was in progress, but that sufficient time had not elapsed for definite recommendations to be made.

Written by Dr. R. B. Saltonstall, Acting Librarian.

T. C. EICHSTAEDT, *Sec.-Treas.*

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GRAND RAPIDS BRANCH

The February 9th meeting of the Grand Rapids Branch of the A.E.S. was held in the Esquire Room of the Rowe Hotel. With an attendance of 45 members and friends, the meeting was at once turned over to our speaker for the evening, Mr. Paul R. Pine of the Harshaw Chemical Co. Mr. Pine is one of the foremost authorities on bright nickel plating and many of those hearing his talk said it was the only good talk they had ever heard on bright nickel plating. We will not go into detail on Mr. Pine's talk here but it can be said that he touched on the causes of bright nickel failure, why cleaning must be better for bright nickel, the theory of why the plate is brightened, and a short discussion of the older nickel brighteners. He answered numerous questions put to him by the boys and all in all his talk was very good. Other branches can consider themselves lucky if they can obtain Mr. Pine for a speaker.

In the question box were found the following:—

Q. Should heating coils be put in the bottom of tanks?

A. Of course, there are many variables such as shape and size of tank, type of solution, etc., but in general all members agreed that it is best to keep the coils off the bottom of the tank to facilitate cleaning out. Some people place the coils around the inside of the tank under the anodes and 5″ or 6″ above the bottom while others put a coil in each end of the tank. One must consider ease of cleaning, even temperature, induced electrical currents, and solution movements that raise sediment from the bottom of the tank, when installing heating coils.

Q. Can copper be deposited on small

nails and screws in a copper sulfate solution?

A. The cyanide solutions are more commonly used since the sulfate solution cannot be used for direct deposition on iron or steel. The sulfate solution has several advantages but it does not seem to be popular except in electrotyping.

Q. I am having trouble with rough bright nickel. Have filtered to no avail.

A. The members thought the question rather vague but the common causes of rough nickel are poor anode bags, too much agitation of the solution, poor filtering, and general uncleanliness. Several good articles have appeared recently in the literature describing the use of filter aids and activated charcoal in the purifying of solutions.

CHAS. S. WHALLEY, *Sec.*

NEWARK BRANCH

The regular meeting of the Newark Branch, A.E.S., was held on Friday evening, February 3, 1939, at the club room of the Hotel Douglas, Newark, N.J. The meeting was called to order at 8:30 p.m., with president John Kotches presiding. Other officers present were: Nelson Sievering, treas.; Paul Oldam, librarian; Stephen Leshnick, sarg.-at-arms. Due to the absence of the secretary who was confined to his home with a heavy cold, Mr. Paul A. Oldam was appointed secretary pro tem for the evening.

The minutes of the previous meeting were read and approved.

Mr. Lewis Francis Wheeler was elected to Active Membership and Mr. William G. Borner to Associate Membership.

An application for Mr. Henry Jinks was voted to take the regular course.

Mr. Horace Smith, general chairman for the 1939 Convention reported on his visit to the Chicago Branch Educational Session and Banquet and stated that everyone showed great enthusiasm for the coming convention. He also stated that the Supreme Society had granted the ladies of Newark Branch the right to form a Ladies' Auxiliary.

Dr. B. Brenner of Sigmund Cohen Inc., was presented next as the guest speaker of the evening. His subject was "Metallurgical and Chemical Aspects of Electro Plating Precious Metals". Dr. Brenner's talk was very interesting and he was asked numerous questions which he very graciously answered. He was given a rising vote

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of thanks for his talk by the 22 members present. Meeting adjourned at 10:30 p.m.

The regular meeting of the Newark Branch, A.E.S. was held on Friday evening, February 17th at the club room of the Hotel Douglas, Newark, N.J. The meeting was called to order at 8:30 p.m. by President John Kotches. Other officers present were: George Wagner, sec.; Nelson Sievering, treasurer; Paul Oldam, librarian; Stephen Leshnick, sarg.-at-arms and George Reuter, trustee.

The minutes of the previous meeting were read and approved.

Mr. George Wagner, vice-chairman of the New York-Newark Joint Banquet Committee, announced that everything was ready for a big time at the Hotel Pennsylvania and that he expected an attendance of at least 200 from Newark. He again urged the members to donate some door prizes and asked the Branch to make a cash donation to be used for door prizes. Upon motion duly made and seconded it was voted that Newark Branch donate $10.00 to be given away as two $5.00 cash door prizes at the banquet.

Mr. Horace Smith reported on his trip to the Baltimore Washington Educational Session and Banquet and his flight home from Washington on the American Air Lines.

Our Librarian, Mr. Paul Oldam, presented as guest speaker Mr. Gustaf Soderberg of the Udylite Co., who gave a very interesting talk entitled "New Developments in Cadmium Plating". He told us of his experiences in Cadmium Plating with all kinds of Wetting Agents and Addition Agents. His talk was accompanied by slides on which he showed the advantages and disadvantages of certain groups of these agents. Numerous questions were asked and Mr. Soderberg answered them satisfactorily. He was given a rising vote of thanks for his talk by the 28 members present who attended this meeting which adjourned at 10:30 p.m.

GEORGE WAGNER, *Sec.*

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HARTFORD BRANCH

The Hartford Branch of the A.E.S. held its regular monthly meeting on Monday evening, Feb. 20, 1939, at the Elk's Club, Bristol, Conn.

The meeting was called to order at 8:15 p.m., with Vice-President Christie in the chair. Minutes of the regular, as well as of a special meeting, were read and accepted.

All communications were read and placed on file. One applicant, Mr. G. F. Robisin, was elected to associate membership.

The secretary was instructed to send a special questionaire to all active members, to get their decision as to a branch exhibit for the National Convention.

Plans were discussed relative to the regional Educational Session and Banquet to be held on April 15, at the Garde Hotel, Hartford, Conn.

Mr. G. Klinkenstein, vice-pres. of the Maas & Waldstein Co. of Newark, N. J., was speaker for the evening, and gave a very fine talk, accompanied with a sample board of over sixty different finishes, on "New Wrinkle Finishes".

Mr. Klinkenstein's talk is the best one we have heard, relative to lacquer and lacquer enamel finishes. He gave a lot of information relative to the application of the finishes, many of them single coat jobs, that gave good indoor service as to protection and wearability.

In conclusion he was given a rising vote of thanks.

The meeting adjourned at 10:30 p.m.

VERNON E. GRANT, *Sec.*

PROVIDENCE-ATTLEBORO BRANCH

The Providence-Attleboro Branch held its regular meeting at the R. I. School of Design, Monday, Feb. 20, 1939. Mr. Edward H. Bucy, of the Atlas Powder Co., Zapon Division, was scheduled to speak on "Duranite Finishes", but, he was, however, unable to be present and our old time friend, Mr. John Oberender substituted.

Mr. Chace introduced the speaker and in doing so, took occasion to pay his personal respect for John.

The speaker was well supplied with samples of the Duranite. There were radio cases, base parts of electric lamps, placques, etc., finished in various shades and kinds, with different degrees and times of heating, and mostly with one coat of duranite. These were passed around, as he talked, so that at the close of the talk, there was a lively question period, in which the questions were clearly and directly answered either by John or his assistants. This was a timely, and profitable talk for the Branch.

While listening to the speaker, the secretary was reminded of the time, some 15 to 20 years ago when John and several others of the Zapon staff were frequently at our meetings.

There were 30 present.

J. ANDREWS., *Sec.*

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TORONTO BRANCH

Feb. 27 meeting opened with President Acheson in the chair. He regretfully informed the members that Mr. Harry Hands our secretary was sick and in the hospital. He also reported Mr. Fred Bing, another member being sick, and appointed Charlie Kemish to act as secretary for the evening. Letters were read from Mr. George Hogaboom and Joseph Downes, also communications from Detroit and Milwaukee branches and will be taken care of. Tom O'Keefe gave a report on the card and luncheon party to be held on March 17th, and all the committee recommendations were accepted. Under good and welfare, only one question was found in the box, and turned out more in the nature of a debate.

Q. What is the best way to strip copper from steel?

A. by Mr. Smith: Strong cyanide sol with reverse current.

A. by Mr. Jim Graham and Mr. Harry Bird: Leave overnight in strong sol of cyanide.

A. by Mr. Mundy: After plating quite a number of steel pieces about 5 inches long with a knob on one end, it was found that the knobs had to be hardened, that is, the knobs only, so that the copper had to be stripped from the knobs. These pieces were racked with the knobs immersed in a sol of chromic acid. Chromic acid 6 oz., water 1 gal., and stating this was the quickest and most satisfactory way.

This ending the business session, Jim Graham volunteered to look after the books till our secretary's return. This isn't the only time Mr. Graham has taken on the extra work; in fact he has been in harness ever since he joined the branch, and the members appreciate his willingness very much. Thanks to you Jim!

Our president voiced the sympathy of the members and wished a speedy recovery for Harry Hands and Fred Bing.

The meeting was then turned over to Mr. J. C. Honey of the Johns-Manville Co., who gave a talk along with talking and moving pictures, entitled "Celite, The Story of the Diatom", revealing the History and Characteristics of diatomaceous earth, showing charts and photomicrographs as to its usefulness in science and industry, as a filter aid in plating solutions, oils and sol-

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vents and apparently no limit as to its usefulness. Mr. Honey being well conversed on the subject of filtration answered questions for over half an hour with the members showing appreciation of 90 minutes well spent.

Attendance 58.

JAMES S. CAIRNS.

PITTSBURGH BRANCH

Our meeting of March 3rd was held in the U. S. Bureau of Mines, Pittsburgh, with Mr. E. C. Friedl, of the E. I. du Pont de Nemours & Company, as our speaker. Mr. Friedl spoke upon the subject of "Bright Copper Plating" and proved to be a good drawing subject, as we had 42 persons present, one of the largest we have had this winter, and we trust that those present are now interested enough to come out to our next few meetings, before the summer vacations.

I am glad to report the following new applications for membership: Donald H. Schantz, associate, 826 Seventh street, Coroapolis, Pa.; James Henry Connolly, associate, 1230 Hiland avenue, Coroapolis, Pa.

These young men are in the research department of the Standard Steel Spring Co., and we are glad to welcome them to our roll of membership. I expect to have several more applications before our next meeting.

STANLEY HEDDEN, *Sec.-Treas.*

DAYTON BRANCH

The members of the Dayton Branch met at the Dayton Engineers Club on Friday, March 3rd.

Following the reading of the minutes of the previous meeting our President Mr. Conley asked all the members to stay for a business meeting immediately following the educational part of our program.

At this time Mr. Luechauer introduced our speaker for the evening, Mr. Wallace G. Imhoff whose subject was "General problems and process of hot dip galvanizing".

This subject was not strictly one of electroplating but the interest shown by those in attendance proved that it was very interesting. Mr. Imhoff first gave some idea of the size of the galvanizing industry by showing the amount of metal that was treated in their biggest year, and also the amount of metal deposited.

The problems of this metal coating method are many. There are thirteen different fields of galvanizing, each requiring different equipment and handling during the process. One of the big problems is the proper heating of the pots that contain the molten zinc. These range in size from one holding less than a ton of metal to some holding as high as one hundred and forty tons. Around these pots must be built an oven that will heat them uniformly and not give heat in spots. When one of these hot spots occurs on a pot, running the temperature at that spot above the safe limit the zinc acts on the steel sides and will destroy them in a short time.

Care must be taken to see that the metal being galvanized is handled carefully. Mr. Imhoff told of a case where a drum was being galvanized and only the holes had been plugged. When this was immersed in the molten zinc an explosion resulted, killing several men and injuring several more.

Slides were shown, giving the amount of metal deposited at different temperatures and at different dragout speeds. Many of the different sizes and shapes of the pots and some of the ovens from the first coke fired ovens to the most modern electrically heated ones were shown in the same manner.

At the close of the question period following this most interesting discussion Mr. Imhoff was given a rising vote of thanks.

Following this talk the members of the Dayton Branch held a business meeting, at which four new members were elected. These new members are: Mr. Wilbur Ray Sigler, Mr. Veneard Ballweg, Mr. Frank E. Ganter, Mr. Ralph Stolle.

The members voted to support the resolution submitted by the Milwaukee Branch to prohibit local branches of the A.E.S. from soliciting paid advertising in support of local functions. Paid advertising to be used only for the National Convention.

An exhibit committee was appointed consisting of Mr. Cochran, chairman, Mr. Valentine, Mr. Speakman, Mr. Garrison, Mr. Folz, Mr. Smith, and Mr. Haas.

A Membership Committee was also appointed. The men on this committee are: Mr. Vandevander, chairman, Mr. Folz, Mr. Smith, Mr. Skinner, and Mr. King.

It was decided that for our May meeting there would be no outside speaker, this meeting to be given over to our own members and to be a general get acquainted night. To further promote this meeting it was decided to get each member a badge to be worn so that it can be easily read, having on it his name, city and the name of the company employing him.

At this time our meeting was adjourned until the first Thursday in April when we will hear Mr. Daw and see his "Demonstration of What Happens in a Plating Barrel".

CORLISS W. POWELL, *Sec.*

BOSTON BRANCH

Boston Branch met Thursday the 2nd at the Bradford Hotel, Boston, with President DeLorme in the chair.

Minutes of the previous meeting read and approved, bills read, moved they be paid.

Communications were read. One from Milwaukee Branch in regards to an amendment to be acted upon at the next convention. It is to restrain the branches from soliciting advertisements for the branch banquets. This was put over to a later date.

One application was read for the first time and turned over to the board of managers: Robert Magnuson, 46 Roberts Street, Malden, Mass.

Bill Treadwell reported that every thing was ready for the best time ever held by the Branch.

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Arthur Mintie, chairman of the exhibits, asked that all those that can and those that have exhibits, to please try and have them at the next meeting so that he can plan for the size of the frame for them.

Stanley Knight made his report on the New York-Newark Banquet of Feb. 18th. He said it was very interesting. He gave a little talk on each of the following speakers; Dr. C. L. Mantel, Frederick Fulforth and Joseph Haas. In the evening a large gathering sat down to a very fine dinner. A vote of thanks was given Mr. Knight for his interesting report.

We had a visitor who came to attend our banquet, and we were glad to see him. Mr. Philip Sievering, of Newark Branch. He spoke of the coming convention and hoped that Boston Branch would have the best exhibit on display. Come again Mr. Sievering.

We had another visitor, Mr. Beck of the Akron Varnish & Paint Co. He told that in his travels he saw a new cleaner that he says is one of the best he has seen yet. He says it does a great job.

Arthur Mintie read a letter from Geo. Hogaboom, in regards to stripping nickel from steel. He asked the members to try this experiment and bring the information to the branch for discussion by the librarian.

A. W. GARRETT, *Sec.*

TOLEDO BRANCH

A regular meeting of the Toledo Branch of the A.E.S. was called to order by the President, Stanley Moore, at 8:30 o'clock, March 2nd. Minutes of the previous meeting were then read and approved. A resolution from the Milwaukee, Wis., Branch was tabled for future consideration.

At this time the chairman of the research committee gave his report, concerning a stripping solution of sodium nitrate. The chair at this time introduced the speaker of the evening, Mr. Bower, from the Howel Mfg. Co., who presented a very interesting paper on a new method of slow speed polishing, and the finishing of metals. He also showed moving pictures showing several operations in the manufacturing of metal furniture, where this new method is actually being used in polishing and buffing. The program was very well received. In fact, it was so interesting that, at the request of the membership the picture was run the second time, at the end of which Mr. Bower very graciously answered many questions asked him from interested parties.

It was decided to have a speaker from the du Pont Co. at our next meeting. The subject to be on the new high speed copper.

There being no more business before the meeting, it was adjourned at 10:00 o'clock p.m.

G. H. BERGEMAN, *Sec.*

MILWAUKEE BRANCH

The Milwaukee Branch of the A.E.S. held its regular monthly meeting on Thursday, March 2, at the Republican Hotel.

President Dexter Rhodes called the meeting to order and the minutes of the previous meeting were read and approved.

After a short business session, in which the application of one new member was received, and the election of seven new members took place, the meeting was turned over to the Librarian, Henry Bornitzke.

Our guest speaker, Mr. Leroy Beaver, was introduced by our 1st Vice-President, Mr. Ray Goodsell.

Mr. Beaver's talk on Barrel Burnishing was very impressive and educa-

tional, and everyone, I believe, agreed that Mr. Beaver can really get his point across so that it can be understood in plain everyday language.

The meeting adjourned at 10:30 p.m., but the crowd, which was better than 50 members and guests, stayed around until 1 a.m. to inspect the various samples that Mr. Beaver had on display and also for a chance to give the speaker the so-called 3rd degree. There is no doubt that Mr. Beaver will always be welcomed by the Milwaukee Branch.

The guests for the evening came from the Chicago Branch, namely the Messrs. Gilbertson, Longfield, Frank and James Hanlon.

Refreshments were served and a good time was had by all.

P.S. Don't forget April 29th. That is the date for the Milwaukee Branch Educational Session and Banquet to be held at the Hotel Schroeder.

ROBERT B. GOODSELL, *Sec.-Treas.*

DETROIT BRANCH

March third meeting called to order at 8:30 p.m., J. W. Higgins presiding. One hundred and thirty-five present.

Minutes of last meeting read and approved. Ten applications reported favorably by the Board of Managers and they were unanimously elected to membership. Four reinstatements. One transfer received from Bridgeport Branch. Thirty-five new applications received and referred to Board of Managers.

A letter from A. Scafuri, who had been confined in Harper Hospital thanking the Branch for the flowers they sent him while there. Mr. Scafuri has recovered from his operation and was present at the meeting. We are certainly glad for that.

A letter from Ray Goodsell, First Vice-President complimenting Detroit Branch and Carl Heussner, chairman of new membership committee on their good work of securing new members.

It was decided that we hold open April meeting for accepting more new applications to be applied on this fiscal year, there being quite a few who did not get their application in at the March meeting.

It was also decided to have a buffet lunch served at our April meeting.

Mr. H. Leroy Beaver, "Consultant" of Landsdale, Pa., was introduced. His subject "Barrel Finishing of Metal Products". He gave an extemporaneous talk and covered a lot of ground as well as other materials, such as, leather, rice, sawdust in connection with barrel finishing and also went into finishing "Plastics". Time was to short for him and we adjourned at 10:40 p.m.

THEODOR C. EICHSTAEDT, *Sec.-Treas.*

PHILADELPHIA BRANCH

Meeting called to order by Pres. Joe. E. Underwood, presiding. Roll call of officers. Harry Snyder absent under doctor's care. Minutes of previous meeting read and approved as read. Applications of Messrs. Syril Wharrad, Carl Doerr, for active membership, and Messrs. J. W. Bardsley, Peter B. Ruppe, Jule Weychart, for associate membership referred to Board of Managers. Communication from 1st Vice Pres. Ray Goodsell read—moved and seconded same be received and filed. Carried. Communication from 3rd Vice Pres. J. L. Downes, read; moved same be received and requests complied with. Carried.

Librarian E. J. Zurbach, Jr., introduced Mr. Al. Hirsch, who gave an interesting talk and a very good exhibition of the various instruments and their uses which held the interest of all present and a lively discussion fol-

owed. At conclusion of lecture it was moved and seconded Mr. Al. Hirsch be given a rising vote of thanks. Carried. Librarian E. J. Zurbach, Jr., informed Branch Dr. Walter E. Meyer will be our guest at March meeting, March 24, 1939. Pres. Joe. E. Underwood expressed deep gratitude to the members for their interest and co-operation by the active participation in the Branch meetings and their large attendance.

It grieves officers and members of Philadelphia Branch to hear our old friend and active worker Harry Snyder is under the Doctors care. We hope to hear of Mr. Harry Snyder's recovery as we miss his smiling countenance greatly.

ROBERT E. JACKSON, JR., *Sec'y*

SPRINGFIELD BRANCH

The regular monthly meeting of the Springfield Branch A.E.S. was held at the Hotel Charles on Monday, Feb. 27, at 8:00 p.m. Thirty-two members and guests were present.

The meeting was called to order by the President, Mr. Costigan. The minutes of the previous meeting were read and approved. A communication from Mr. Oldam, chairman of the Platers' Exhibits for the Asbury Park Convention was read. In response, Mr. Kennedy agreed to appoint a local chairman to secure the exhibits representing the local branch.

An announcement of the Boston Branch meeting to be held on March 4th was read. All members were urged to attend.

Mr. W. Kennedy introduced the speaker of the evening, Dr. Walter Meyer, who had chosen for his subject "The Filtration of Plating Solutions". Dr. Meyer described the construction of the different types of filters used for filtering plating solutions and explained the use of Filter Aids (diatomaceous earth). He described the diatoms and told how they ended up in a deposit of the diatomaceous earth. Dr. Meyer explained that filter aid could be used to the best advantage by making a slurry with water, immersing the intake and outlet hoses of the filter and operating until the solution was perfectly clear. The hoses are then replaced into the plating tank. The importance of clear solutions in obtaining smooth and non-porous deposits was clearly shown by slides.

The following questions were answered:

Q. Are centrifugal filters used for filtering plating solutions?

A. At present no filter of this type is used on the market.

Q. Can a good deposit be obtained by brush-plating?

A. An excellent deposit of non-porous silver can be obtained by the brush method. Other metals also may be plated with excellent results.

Q. Can bright nickel be barrel plated?

A. With the exception of the cadmium stick method, I do not know of anyone who is doing it.

Dr. Meyer's interesting talk and discussion was thoroughly enjoyed by everyone and he was given a rising vote of thanks.

The meeting was adjourned at 10:30 p.m.

D. S. HARTSHORN, JR., *Sec.-Treas.*

WATERBURY BRANCH

The regular meeting of the Waterbury Branch of the American Electroplaters' Society was held at the Hotel Elton, Friday, March 10th.

The speaker was Mr. E. J. Weaver of the Johns-Manville Corporation, who spoke on "Celite—The Story of the Diatom". Mr. Weaver showed a talking moving picture which gave an

unusually clear account of the origin of diatomaceous earth from the diatom to the present times in California. Also, he showed the various uses to which this material can be put and its physical properties. After showing the moving picture Mr. Weaver gave a short account of the use of this material in filtering plating solutions and answered several questions from the floor.

The meeting was attended by several members of other branches and after the meeting was formally adjourned at 10:15 informal sessions were held until well after 11:00.

A short business meeting was held before the speaker of the evening was introduced and at that time the subject of exhibiting at the International Convention was taken up. It was decided to hold an exhibit if material enough could be obtained. President Lougee will handle the details of preparing the exhibit.

E. T. CANDEE, *Sec.*

CHICAGO BRANCH

The regular monthly meeting of the Chicago Branch was held March 11, 1939 at the Atlantic Hotel. President J. W. Hanlon presiding.

Communication from Milwaukee read and acted upon. Application of E. G. Coffey read and was elected to membership. A motion was made and passed to have the April meeting on April 15 instead of the regular night.

The meeting was then turned over to the acting librarian, Mr. O. E. Servis, who introduced Mr. W. E. Shumay of the Norton Co., who gave a general talk on the history of abrasives and presented a two reel talking picture, one in color and one in black and white, on the manufacture of artificial abrasives and wheels made from them.

Mr. R. L. Schwaegerle conducted the discussion.

Mr. Shumay was given a rising vote of thanks and the Norton Co. was congratulated on the splendid educational feature they have to present to the members.

The following questions were found in the question box:

Q. What is a good formula for a hard chrome plating solution?

A. Chromic acid 250 g/l; sulphuric acid 3 g/l.; temperature 155 degrees F.; 3 amperes per sq. inch.

Q. What is a good acid pickle for cyanide hardened parts before nickel plating?

A. Hot 10% sulphuric acid.

Q. What concentration of non-pitting agent should be used in nickel plating solutions?

A. The concentration varies, the surface tension of the solution should be kept between 35 and 39 dynes per sq. in.

M. H. LONGFIELD, *Sec.-Treas.*

Mr. Mayer L. Freed, Seymour Mfg. Co., Seymour Conn., has been appointed a member of the Research Committee of the A.E.S. by the Chairman, Mr. George B. Hogaboom.

The Chicago Branch will hold their April Meeting on April 15, 1939 instead of the regular night. This is the Third Saturday instead of the Second Saturday.

Here and There

BOSTON BRANCH 5TH ANNUAL BANQUET

Boston Branch upheld its reputation this year again, in the very successful educational session and banquet that was held at the Hotel Bradford on Saturday, March 4.

Long before the afternoon meeting started, groups were seen in every part of the hotel greeting one another or else solving each others plating problems or maybe just talking generalities. Anyway the spirit of friendliness always characteristic of the Hub, was prevalent on this occasion and continued throughout the day.

Three important speakers were officially scheduled, but by the time Arthur Mintie, who was chairman, got through, there were at least six others introduced, all of whom captivated the audience by their oratory. One of these was Francis Mackie, 1st President and now honorary member of Boston Branch. Mr. Mackie spoke of his many years in the plating industry and never lets himself get stale, but always keeps up with the most recent events in plating through the various publications and other sources of information. Mr. Mackie got a big hand after his oration.

Louis Gale, another Past President of Boston Branch, spoke briefly regarding the activities of the local Branch past and present. Another outstanding speaker was Frank J. Clarke, who was instrumental in organizing Boston Branch. Then followed Charles F. Campbell of the Boston Nickel Plating Company, the oldest nickel plating job shop in the country.

Dr. Walter Meyer, managing editor of *Metal Industry*, commented briefly on the educational session while Dr. Strachen of Brown University and honorary member of Providence Branch commented very favorably on the growth and progress made by the whole organization in the last decade.

Mr. Floyd Oplinger of the E. I. du Pont Co., opened the educational session, his subject being "Copper Plating from Cyanide Solutions".

Mr. G. A. Klinkenstein, Maas & Waldstein Co., Newark, spoke on new items in Wrinkle Finishes. The speaker had two boards on the platform showing the various samples of beautiful lacquered finishes.

Mr. George Hogaboom's address on the Production of Special Finishes was well received. He also had his two large sample boards with him. These were the object of particular interest at the close of the educational session.

A rising vote of thanks was given the speakers which brought the afternoon session to a close. During the meeting, Chairman Mintie stated that Boston Branch will have an exhibit at the Asbury Park Convention.

Horace Smith, chairman of this year's convention is getting around to all the Branches he can. He brought his body guards with him—Phil Sievering and George Wagner. Both Mr. Smith and Mr. Sievering were among the speakers at the educational session. Guess what Horace spoke about? That's it. The convention at Asbury Park. Mr. Sievering, one of the best liked man in the plating business, told of his enjoyable trip to Boston from Newark by boat and of the kindness and courtesy shown him during his stay in the Hub of the Universe.

There were at least 200 at the educational session and 325 at the banquet.

The Ladies' Orchestra, the entertainient (especially Wee Willie Dee) and the dancing was all that could be desired.

To the president of Boston Branch, Ed Delorme, Andrew Garrett, Boston's one and only secretary, Arthur Mintie, Charlie Hardy, and Bill Treadwell we extend our heartiest congratulations, for a very fine afternoon of helpful knowledge and an evening of pleasure and entertainment.

On behalf of the visiting ladies may we extend our thanks to Miss Ann Baker, chairlady of the Ladies' Reception Committee and her willing co-workers who entertained the members of the fair sex so nicely while their husbands were attending the afternoon educational session.

LETTER OF APPRECIATION FROM BOSTON BRANCH

Boston Branch wishes to extend its appreciation to all its friends in and outside of Boston in making the banquet March 4th one of the most successful and enjoyable ever held by the Branch.

The educational session was of the best with some of the best known men in the American Electroplaters' Society, Mr. F. F. Oplinger, du Pont Co., G. A. Klinkenstein, Maas & Waldstein Co., and G. B. Hogaboom, Hanson-Van Winkle-Munning Co., present. The subjects were heard for the first time in Boston and everyone was interested up to the last minute of this session.

While the men were attending the session the ladies' committee entertained the ladies with a movie show, tea and cake. A fine job by Miss Ann Baker and the rest of the committee.

In the evening three hundred sat down to a very fine dinner, and witnessed a floor show that was funny, and one that will be long remembered by all.

We had with us one of the oldest platers in the country, Mr. Philip Sievering. It was an honor to have him and our first president, Francis Mackie also with us.

Our hats are off to our friends from Newark, New York, Springfield, Bridgeport, New Haven, Providence, and Hartford Branches for the showing they made by coming to our banquet and Boston Branch will be at Hartford strong, April 15th.

We wish to thank all those subscribers to our program, and to those who donated prizes.

We hope you all had a good time and hope to see you all at our picnic this summer.

THE BANQUET COMMITTEE,
Boston Branch, A.E.S.

AN INTERESTING LETTER FROM TWO MEMBERS OF BUFFALO BRANCH

Mr. Wm. Kennedy.
Dear Sir:

Recently Mr. Genco and I discovered a few things concerning the plating of zinc die castings, which I am sure will prove helpful to many of our members.

Taking the complete cycle of plating of copper, nickle and chrome over die castings, which we found porous after polishing and burnishing.

We took the castings and reduced the cleaner to a point where it would not show a gassing while in the cleaner; we made a cleaner consisting of 1/3 oz./gal. tri-sodium and ran this at a 160° temperature with an immersion of 2 minutes non-electrolytic.

After rinsing we proceeded with an acid dip of .75 per cent by volume of H.C.L., 26 seconds immersion and the usual cold water rinse, following with copper, nickel and chrome.

Before this cleaning process it was necessary to have a degreasing of all polished pieces, the burnished pieces required a little tumbling in sawdust.

We found that the least gassing in the cleaner and acid dip showed the best results.

After the final plating we found it to be very adherent and could stand a terrific impact from any source.

These tests were made with our regular daily production of about 90,000 pieces, which showed as low as 2 per cent rejects.

Sincerely,
F. NOWAKOWSKI.
J. GENCO.
Buffalo Branch.

BALTIMORE-WASHINGTON BRANCH

At their meeting on Saturday, March 4, the Baltimore-Washington Branch, A.E.S., heard a very interesting talk by Mr. Wm. Schneider, better known as "Cyanide Bill" of the R. & H. Division, E. I. du Pont de Nemours Co.

The subject was "Bright Copper" and in his talk he brought out the following facts. In both laboratory and commercial work they are plating with a special solution of the du Pont Co., that they are getting 100% efficiency both at anode and cathode, giving a bright copper finish on die castings and steel in both the racked work and the tumbling barrel.

Mr. Schneider pointed out that they were getting fifteen thousandths of copper in as short a time as twenty minutes. He strongly advised the continuous filtering of the solution; also recommended agitation by moving the racked work. In the tumbling barrel this agitation is not necessary.

To say the least, the samples that Mr. Schneider distributed among the members of the branch were of exceptional quality, being free from pits or roughness, both the smooth and the recessed work.

The Baltimore-Washington Branch feels greatly indebted to Mr. Schneider for the knowledge that he left with them.

CINCINNATI BRANCH. Due to being pressed for time, having two interesting speakers for one evening, the business routine of our last regular meeting of Feb. 23rd, was dispensed with, to give the speakers ample time to express themselves, as well as others, for discussion.

Our Executive Secretary, Mr. W. J. R. Kennedy, paid Cincinnati Branch members his first visit, at the solicitation of the Supreme Executive Board, which act of the Board was fully appreciated by the membership of the Cincinnati Branch.

It is needless to state, that Mr. Kennedy has won the friendship of our members with whom he made contact, and especially was it appreciated, the valuable help afforded our member, Mr. O. T. Towner, chairman of the membership drive, during the 3 day stay in Cincinnati.

Under the impetus of Mr. Towner's membership drive, assisted by Mr. Kennedy, we had new faces at our meeting, which otherwise would have been absent, and expressions on the part of visitors bespoke their interest, in what Mr. Kennedy had to say with reference to benefits derived through membership in the American Electroplaters' Society.

Mr. Kennedy's further remarks with reference to conditions in and around Cincinnati, as he and Mr. Towner found them, had the inspiring effect on the members of the Cincinnati Branch present, to want to see the Branch grow in size and usefulness and our appreciation of his talk was evidenced in sincere applause at the close of his remarks.

We also had the pleasure of hearing a very interesting talk given by Mr. Dimon, chemist, connected with the Carnegie Steel Co. of Pittsburg. His subject being, "Various Types of Steel and Their Adaptability for Plating".

Mr. Dimon was kept bust for a while, after his talk, answering numerous questions, brought out through considerable discussion.

A rising vote of thanks, indicated to the speaker our appreciation of his talk.

Good-night wishes were then exchanged.

JOS. ADLER, *Sec.*

MR. AND MRS. HOGABOOM START FOR THE COAST. Mr. and Mrs. George B. Hogaboom are on their way to California for a few weeks trip. Mr. Hogaboom will speak at the Los Angeles Branch meeting on Saturday, March 25, and will address a joint meeting of the A.E.S. and A.S.M. in San Francisco, April 2.

NEW YORK-NEWARK JOINT MEETING. Thanks to the united efforts of the officers of the above branches a most successful joint educational session and banquet was held at the Pennsylvania Hotel, New York on Saturday, Feb. 18.

Dr. C. B. F. Young was introduced as the chairman by President Ralph J. Liguori. Before the scheduled speakers started their addresses, Mr. Liguori introduced the members of the Executive Board, all of whom were present except President Phillips, who has just recently returned to Detroit from an Eastern trip.

The speakers and their subjects were as follows. Joseph Downes, Remington Rand, Middletown, "Why I am a member of the A.E.S." Joseph Haas, The Bassick Co., Bridgeport, "The application of Scientific Management in the Plating Room". Frederick Fulforth, Proctor Elec. Co., Philadelphia, "The Educational Program and Policy of the A.E.S." Dr. C. L. Mantell, Chemical Consulting Engineer, Brooklyn, "A History of the Electrochemical Industry".

Ist Vice President, R. M. Goodsell, came on from Milwaukee. Past President A. B. Wilson from Detroit also attended.

In giving credit where credit is due we must not forget the enthusiasm with which the secretary of New York Branch, Mr. Frank MacStoker does things. Frank was one of the busiest men at the meeting looking after the details, and being used as an "information please" individual generally.

The banquet was well attended. Representatives from all the New England as well as several other A.E.S. Branches were present.

Although there was no discussion at the educational session, the speakers left plenty of food for thought in the minds of the audience, regarding the future of electroplating as related to industry.

There are only two more meetings of this nature before the Convention in June. Los Angeles and San Francisco, March 25 and the regional meeting of the New England Branches at Hartford, April 15.

VISIT TO CINCINNATI BRANCH. By request of the executive board the secretary was asked to visit Cincinnati Branch as a means of helping increase the membership and stimulate the Branch generally. Arriving in the Queen City on Monday Feb. 20th, we paid our respects to Mr. Gardner, Mr. Vogel and Mr. Campbell of *Products Finishing* and visited a large manufacturing concern regarding advertising in the REVIEW.

On Monday eve we met the officers of the local Branch and had a long discussion. Mr. O. T. Towner, chairman of the membership committee of Cincinnati Branch, and the executive secretary spent the next three days visiting the various plating plants and job shops. Included in this visit were the Chamber of Commerce and the Metal Trades Assn. At both of these places we were well received. Mr. Towner using his car, we were able to visit twenty-two shops and factories including the Crosley Plant where we got a nice reception from the personnel manager and the plating supervisor. The latter and his two assistants came to the meeting on Thursday night.

At the invitation of Mr. and Mrs. Towner, the officers met at their home on Wednesday evening where further plans were discussed. This meeting broke up about midnight after some fine home-made cake, sandwiches and coffee provided by the hostess were enjoyed.

At the meeting on Thursday night there was a good attendance. The speaker was Mr. Richard Dimon of Carnegie Steel Co. His subject was "The Costs of Finishing Steel". A long earnest discussion followed the speakers address. This was a good meeting, and a fine feeling of good fellowship was manifested among the members and friends who attended.

The Cincinnati boys were pleased to have a visit from a representative of the Supreme Society.

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More than ever before, metal cleaning is an important operation in the manufacture of a metal product. New finishes and restricted time allowances create new problems.

There is no such thing as a universal metal cleaner, but whether you are cleaning prior to plating, lacquering, synthetic or porcelain enameling . . . whatever your finishing operation is, your Wyandotte Service Representative is interested *and able to help*. Call him today.

REGIONAL MEETING OF THE NEW ENGLAND BRANCHES A.E.S.

At the Hotel Garde, Hartford, Conn.

Saturday, April 15, 1939

SPEAKERS

Mr. A. B. Wilson, Past Supreme President, A.E.S., Chevrolet Motor Co., Detroit, Mich. Subject—"Research."

Mr. Ed. Charleston, Yale & Towne Mfg. Co., Stamford, Conn. Subject—"Finishing Die Castings."

Mr. Arthur W. Tracey, American Brass Co., Waterbury, Conn. Subject—"Corrosion of Plated Products."

Mr. T. H. Chamberlain, Chase Brass and Copper Co., Waterbury, Conn. Subject—"The Importance of Chemistry to the Plater."

Educational Session 2:30 Banquet 7:00. Entertainment and Dancing. Tickets $2.50.

ELLSWORTH T. CANDEE, *Treasurer.*
Metal Hose Div., American Brass Co.
Waterbury, Conn.

Ladies will be entertained in the afternoon.

The possibilities of increasing the membership are good. The members will have to get behind Mr. Towner, however, and give him their hearty support. The manufacturers in the Cincinnati territory must be constantly reminded of the benefits of the A.E.S. to their platers. This can best be done by the members themselves.

We like the spirit of the Branch officers. The president, Mr. Robert Knoeptler is a fine young man full of enthusiasm. Mr. Joe Adler, the secretary has been a veteran of many years service and has been faithful and loyal. We look for results in the near future provided everyone in the Branch starts a boosters campaign.

Before leaving Cincinnati we crossed the Ohio River Bridge into Kentucky, where several large and small plating plants were visited.

The Branch members would be pleased to have a visit from some of the other Supreme Officers, especially President Phillips. We hope Mr. Phillips can grant their request when in the vicinity.

We ask our members to write the officers of Cincinnati Branch and encourage them in their desire to put their Branch on a par with other Branches of the Society.

Mr. Towner's address is 2350 Nicholson St., Cincinnati. Mr. Adler, secretary, 1613 Kellywood Ave.

Thank you boys. We had a most enjoyable visit. Now let's prove that the trip was worthwhile by an increase in membership and a renewed interest at your branch meetings.

BINGHAMTON BRANCH. Leaving Cincinnati at midnight, Feb. 23, after their meeting, our next destination was Cortland, N. Y., where the Binghamton-Syracuse Branch held forth.

An invitation by Mr. George Simmons, the hard working secretary, influenced us to stop at Syracuse and take the bus to Cortland on an extremely cold afternoon and evening. Despite the weather there was a very large attendance. Our good friend, Oliver Sizelove, of the Frederick Gumm Chemical Co. was the speaker. Oliver always has something of interest to offer. After reading his paper, which dealt mostly with cleaning methods, there was a long discussion on various plating problems.

We were pleased to greet the Binghamton members once again.

No matter how we may differ with Austin Fletcher on matters of policy, there is always something about him we have to admire. None of us will forget the excellent work Austin did last year as chairman of the Exhibits Committee at Milwaukee.

Having travelled over the New York State roads in the winter time with plenty of snow and ice, we must say a word of commendation for the boys in and around Binghamton who attend the Branch meetings. Maybe it was a tribute to Oliver, anyway, we were pleasantly surprised at the number present.

BUFFALO BRANCH. On Friday evening January 20, after a brief business session presided over by Pres. Joe Ruff, twenty-nine members of the Buffalo Branch enjoyed an informal talk by Mr. W. J. Schneider (Cyanide Bill) of the R. & H. Chemical Department of the E. I. du Pont Co., on "Modern Brass and High Speed Copper Plating". The speaker humorously portrayed the difficulties of brass and copper plating in the twenties, and then traced the development of these processes by describing the methods evolved in brass and copper plating zinc die castings today. The excellence of the method of brass plating lamp fixtures was shown by numerous samples. The permanence of these brass coatings was illustrated by samples five years old which still retained their original pleasing yellow luster. Mr. Schneider claimed that absorption of brass into zinc is only slight at ordinary temperatures even over long periods and showed samples which pretty well substantiated his views.

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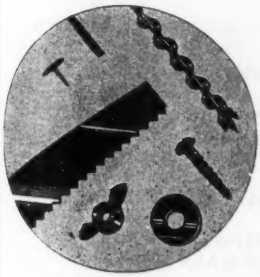

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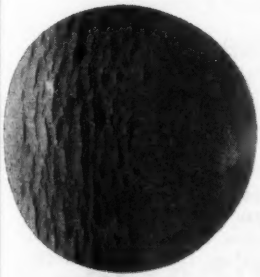

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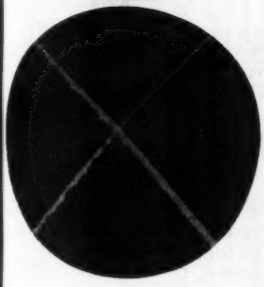

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JETALized iron or steel, dipped in our Jet-oil, stops corrosion attack for long periods of time — in laboratory tests showed no appreciable attack after 165 hours in salt spray.

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The advantages of the du Pont High Speed Copper plating process as a base plate for the standard nickel chromium finish, both on steel and zinc die castings, were then discussed in that "straight from the shoulder" style so characteristic of W. J. Schneider whenever he talks. The answers to a stiff battery of high powered questions furnished a very fitting close to an entertaining and instructive evening for all. WILLIAM HART, *Sec.*

TORONTO BRANCH. We hope the secretary of Toronto Branch, Mr. Harry Hands, is completely recovered from his recent illness.

MILWAUKEE. 1st Vice President R. M. Goodsell of Racine, has been in the hospital, but is recovering nicely. Best wishes Ray for your continued improvement.

DAYTONA BEACH, FLORIDA. Mr. Walter Fraine, former Research Committee treasurer, writes as follows:

> Attached you will find a check for $96.83, making seventh and final dividend on the Research Fund deposit in the closed Union Trust Co. of Dayton, Ohio. In my opinion there never was any good reason for this bank to go into liquidation, except the fear of panic in the minds of the people regarding all financial institutions at that time. You will remember that I have informed you several times in the past that I believed the bank would pay out 100%. This last dividend gives us just 99% of our total deposit.
>
> Yours very truly,
> WALTER FRAINE.

Thank you, Mr. Fraine.

DETROIT. Once again congratulations for your membership report. 10 elections, 35 applications, 4 reinstatements for March. That's splendid!

HARTFORD. All roads lead to Hartford Saturday, April 15. We'll meet you there!

NEW HAVEN BRANCH

A business meeting of the New Haven Branch held Tuesday, Feb. 14, 1939, at the Sterling Chemistry Lab of Yale University opened at 8:15 p.m. with President Joe Downes in the chair. A roll call of officers was read. Several communications were read and placed on file. Bills against the Branch were read and voted paid.

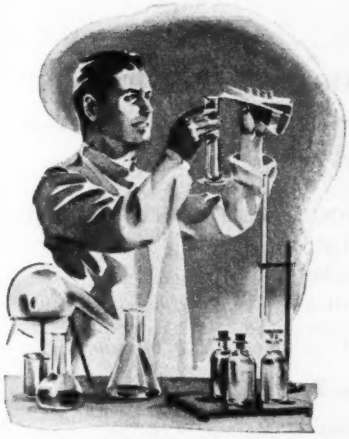
Joe Downes, reporting on plans for the combined Branch banquet, announced that the affair would be held the third Saturday in April at the Hotel Garde in Hartford. The tickets for this educational session, banquet, and dance will be $2.50 per person. Among the speakers will be Past President Wilson of the Detroit Branch. Joe Sullivan, in the absence of Tom Chamberlain, reported the following for the educational committee: The next open meeting will be held on the first Tuesday in March with Mr. Oplinger of the E. I. DuPont de Nemours Co. as guest speaker.

A motion was made, seconded and unanimously passed to the effect that the President appoint a committee to take care of the preparation of a Branch exhibit for the National Convention at Asbury Park. The following committee was then appointed: George Knecht, chairman; R. Mooney, C. Johnson, H. Smith, and H. Creamer.

Jack Daley, plater of the New Haven Clock Co., was unanimously elected to active membership in the Branch.

The meeting adjourned at 9:05 p.m.

Following the business meeting, Henry Creamer, supervisor of Electroplating and Finishing at Winchester's, gave a very interesting and informative talk on Electroplating.



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If you have a degreasing job which is giving you trouble, Perm-A-Clor and the free services of a Detrex Engineer will solve your problem. The coupon will bring complete information.

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"EDUCATIONAL PROGRAM FOR 1939 CONVENTION"

Arranged by Educational Committee, George B. Hogaboom, Chairman

Sessions start promptly on time!

FIRST SESSION — MONDAY AFTERNOON JUNE 19TH — 1:30 P.M.

CHARLES H. PROCTOR, Presiding
Founder, American Electroplaters' Society

1. "Notes on Adhesion of Electroplated Coatings." *A. W. Hothersall*, M.Sc., Woolwich, London, England.
2. "Distribution of Deposits on Cup Shaped Cathodes." *G. F. Gardam*, B.Sc., A.R.C.Sc.
3. "Recent Developments in British Plating Practice." *C. F. Francis-Clark*, Ch.E.
4. "Chemical Methods for Testing Thickness of Metallic Coating." *S. G. Clark*, Ph.D.
   The above papers are contributions from The Electro Depositors Technical Society, London, England.
5. "Review of Electro Plating Methods in France." *M. Ballay*, Ph.D., Consulting Engineer, Paris, France.

SECOND SESSION — TUESDAY MORNING, JUNE 20TH — 9:00 A.M.

JOHN ACHESON, Presiding
President, Toronto Branch

1. "The Role of Diffusion in Electroplating Process." *Dr. J. T. Burt-Gerraus*, Toronto University, Toronto, Can.
2. "Theoretical Training for Electroplating Industry." *Dr. J. U. MacEwan Birks*, Professor of Metallurgy, McGill University, Montreal, Canada.
3. "Electrodeposition of Black Molybdenum Finishes." *R. O. Hull*, Cleveland Branch, The Grasselli Chemical Co., Cleveland, Ohio.
4. "The Ampere Hour Meter." *Burton G. Daw*, St. Louis Branch President, Lasalco, Inc., St. Louis, Mo.

THIRD SESSION — TUESDAY AFTERNOON, JUNE 20TH — 1:30 P.M.

CHARLES C. CONLEY, Presiding
President, Dayton Branch

1. "Chromium Plating Dies and Gauges." *Dr. D. A. Cotton*, Anderson Branch. Director Research, Delco Remy Division, General Motors Corp., Anderson, Indianna.
2. "Anodic Coatings of Aluminum." *Dr. Junius D. Edwards*, Assistant Director of Research, Aluminum Co. of America, New Kensington, Pa.
3. "The Application of X-ray Diffraction to Electroplating Problems." *Herbert R. Isenberger*, St. John X-ray Service Inc., Long Island City, N. Y.
4. "The Filtration of Electroplating Solutions." *Dr. Walter R. Meyer*, Bridgeport Branch. Editor, *Metal Industry*, New York, N. Y.

FOURTH SESSION — TUESDAY EVENING, JUNE 20TH — 7:30 P.M.

JOSEPH UNDERWOOD, Presiding
President, Philadelphia Branch

1. "A Study of Electrolyte Films." *Dr. A. Kenneth Graham*, Philadelphia Branch. Consulting Engineer, A. Kenneth Graham & Associates, Jenkinstown, Pa.

Harold J. Read, Instructor Electrochemistry, University of Pennsylvania, Philadelphia, Pa.

2. "The Story of Steel for Electroplating." *Frederick Fulforth*, Philadelphia Branch. The Proctor Electric Co., Philadelphia, Pa.
3. "The Modern Generator and Rectifier." *Guerin Todd*, Chief Engineer, Hanson-Van Winkle-Munning Co., Matawan, N. J.
4. "Time Pieces — From Sun Dial to Wrist Watches." *L. A. Critchfield*, Philadelphia Branch. Hamilton Watch Co., Lancaster, Pa. This will be of interest to the ladies. The Hamilton Watch Co. are loaning their collection of Time Pieces for this paper.

FIFTH SESSION — WEDNESDAY EVENING, JUNE 21ST — 7:30 P.M.

JAMES W. HANLON, Presiding
President, Chicago Branch

1. "Addition Agents in Electroplating Processes." *Dr. Frank C. Mathers*, Professor Electrochemistry, University of Indiana, Bloomington, Indiana.
2. "A Review of Finishing Methods." *Mr. Gustav Klinkenstein*, Newark Branch. Vice President and Technical Director, Maas and Waldstein Co., Newark, N. J.
3. "Agitation." *Donald Wood*, Boston Branch. Reed and Barton, Taunton, Mass.
4. "Adhesion of Electrodeposits." *Frank C. Mesle*, Oneida Limited, Oneida, N. Y.

SIXTH SESSION — THURSDAY MORNING, JUNE 22ND — 9:30 A.M.

RALPH J. LIGUORI, Presiding
President, New York Branch

1. "The Effect of Certain Wetting Agents upon Nickel Deposit." *C. B. F. Young*, Ph.D., New York Branch.
2. "Practical Suggestions for Efficient Plating Room Lay-out." *D. R. Hartshorn, Jr.*, Springfield Branch. Chemist, Westinghouse Elec. & Mfg. Co., Springfield, Mass.
3. "Summary of Researches on Electrodeposition at the National Bureau of Standards." *Dr. William Blum*, Baltimore-Washington Branch.
4. "Porosity Tests for Nickel Coatings on Steel. *P. W. C. Strausser*, Research Associate, A.E.S., at Bureau of Standards.
5. "Dropping Tests for Zinc and Cadmium Coatings on Steel." *A. Brenner*, Chemist, Bureau of Standards.
6. "Further Study of Measurements of pH in Alkaline Plating Solutions." *M. R. Thompson*, Chemist, Bureau of Standards.
7. "A Study of Silver Plating for Industrial Applications." *C. S. Love* and *A. C. Simon*, Metallurgical Division, Bureau of Standards.

PRESIDENT PHILLIPS APPOINTS COMMITTEES ON PAPERS' AWARDS AND EXHIBITS

Papers' Awards Committee: C. E. Clindinin, Chicago Branch; Prof. E. M. Baker, Milwaukee Branch; Charles C. Conley, Dayton Branch; Eugene J. Zurback, Jr., Philadelphia Branch; N. E. Promisel, Hartford Branch.

Exhibits Committee: Nelson Seivering, Newark Branch; Joseph Downes, New Haven Branch; Ellsworth Candee, Waterbury Branch; Ralph Liguori, New York Branch; Frank Mesle, Rochester Branch.

The Abstract Section

FREDERICK FULFORTH, *Chairman, Program and Educational Committee*

Adherence of Electrodeposited Zinc on Aluminum Cathodes. By H. R. HANLEY and CHARLES Y. CLAYTON. *Am. Inst. Mining Met. Engrs., Tech. Pub. No.* **983,** (1938); *Chemical Abstracts* **33**, 485 (1939). The cause of adherence of zinc electrodeposited zinc to the aluminum cathodes used in electrolytic zinc refining, is usually roughness produced by abnormal etching of the aluminum surface by the acid electrolyte when impurities in the electrolyte prevent complete protection of the cathode by the zinc deposit. Mild etching of the aluminum or steel brushing do not promote adhesion, unless the etching follows brushing. ERNEST H. LYONS, JR.

Chromium Electroplating. Hard Chromium Plating. By OSKAR KRÄMER. *Metallwären-Ind. Galvano-Tech.* **36**, 411 (1938). Optimum working conditions for plating chromium on steel were determined. The bright plating temperature range was between 96° and 114° F. Decorative chromium can be plated from a hard chromium bath, as the essential difference is plate thickness. The heavier plate is not as porous and resists corrosion better; a deposit of .0016″ resists 150 hrs. salt spray.

Highest current efficiency was obtained by a ratio of CrO_3:SO_4 of 200:1, at a bath temperature of 86° F. and a current density of 743 amps./sq.ft. With increase in current density from 93 to 279 amps./sq.ft. at constant bath temperature, the current efficiency rises from 21.4 to 34.3%.

With CrO_3: SO_4, 100:1, the efficiency is lower at low current density, but rises rapidly with increase in current density to about the same as with 200:1 ratio.

With CrO_3:SO_4, 40:1, the efficiency is the same as with 100:1 at low current density (9% at 93 amps./sq.ft.), rising only to 21% at 279 amps./sq.ft.

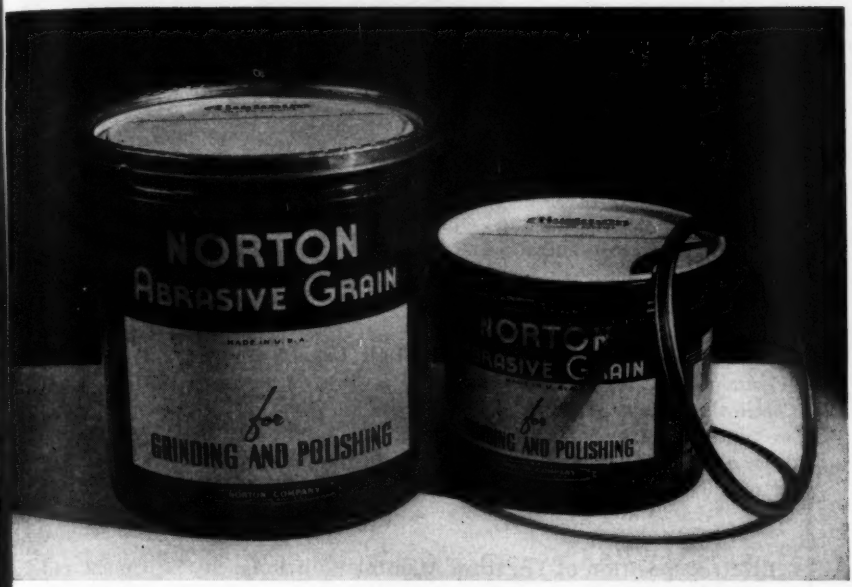
The electroplate is harder at high current densities.

As the bath temperature rises from 86° to 140° F. at 93 amps./sq.ft., the current efficiency drops from 21.4 to 7.3%.

Lead anodes are most suitable for chromium plating in a steel or lead-lined tank. Trivalent chromium tends to build up in a chromium-plating bath, especially if anode area is less than cathode area. Its concentration can be decreased by electrolysis of the solution with a cathode inside of a porous cup. Racks and special anodes used for plating various articles are described. The part of an article not to be plated is covered with lacquer or tape.

L. H. SEABRIGHT.
Chemical Abstracts **33**, 485 (1939).

Electrolytic "Polishing" of Zinc. By W. H. J. VERNON and E. G. STROUD. *Nature* **142**, 477-8 (1938); *Chemical Abstracts* **32**, 8946 (1938). Details of polishing zinc by anodic treatment in 25% potassium hydroxide for 15 minutes or more are given. ERNEST H. LYONS, JR.



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Anodic Action of Tin. I. Passivity of Tin Anode to Electrolytic Tin Solution of Sulfuric Acid. By HISASHI ITO. *Nippon Kenzoku Gakkai-Si* **1,** 229-305 (1937); *Met. Abstracts* (in *Metals & Alloys*) **9,** 450 (1938); *Chemical Abstracts* **32,** 8947 (1938). Within this experimental range the passivity of tin is of mechanical nature . . . In general, the greater the acid concentration, up to a certain point, the more difficult it is to produce passivity. The less the concentration of acid, the higher is the anodic potential, practically independent of tin concentration. M. W. B.

Chemical Abstracts **32,** 8947 (1938).

Nickel Glance Electrolytes and Their Use. By EUGEN WERNER. *Werkstattstechn. u. Werksleiter* **30,** 186-7 (1936); *Chem. Zentr.* **1937, I,** 3708; *Chemical Abstracts* **32,** 8946 (1938). The addition of nickel glance (a nickel ore containing arsenic, sulfur and iron) to the usual nickel bath gives a more dense and tightly adhering nickel plate, which however does not have a high lustre unless the base metal has first been polished. ERNEST H. LYONS, JR.

Electrodeposition of Tin from Alkaline Solutions. By S. BAIER and R. M. ANGLES. Preprint *Electrodepositors' Technical Society*, October 19, 1938, pp. 1-30. Reviews and supplements published data on stannite and stannate baths. Former require addition agents for production of smooth deposits, limit the current density to low values, oxidize too readily to be practical, and tend to give porous deposits.

Stannate baths give smooth, white coatings over a wide range of operating conditions, though some of the latter may markedly affect cathode efficiency. The latter is, in general, increased by an increase in tin content, decrease in current density, increase in temperature, decrease in sodium carbonate, and usually by decrease in caustic soda. Traces of impurities may darken the deposit. A typical bath for 85% cathode efficiency, when considerable carbonate is present, contains 90 g/l (12 oz./gal.) sodium stannate ($Na_2SnO_3 \cdot 3H_2O$) and 12.5 g/l (1.7 oz./gal.) free caustic soda, is operated at 170° F. with 15 amps. per sq. ft. on the cathode and 30 amps. per sq. ft. on the anode.

Not even traces of stannite should be present. When tin anodes are used, one practical way to avoid dissolution as stannite is to begin operations by gradually adjusting the rheostat until the rising current starts to drop back and the voltage increases markedly. This procedure forms a film on the anodes which permits the subsequent use of lower current densities without permitting stannite to form. This film must be re-formed whenever the current is broken for more than a few seconds i.e., it is advisable always to keep some load in the tank.

The stannate-acetate bath is discussed and its proper functioning laid to films similar to the above on the anodes. The use of insoluble anodes (of nickel or iron) is described and methods for analytical control outlined.

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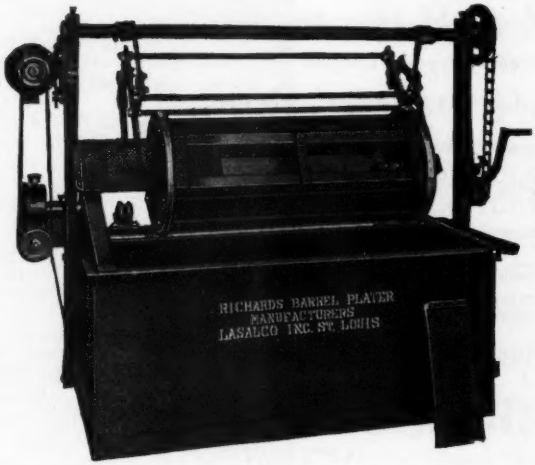

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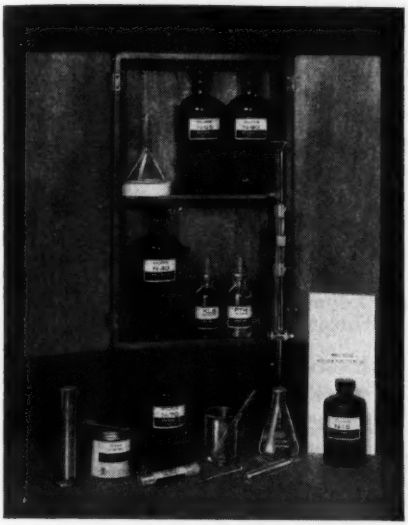

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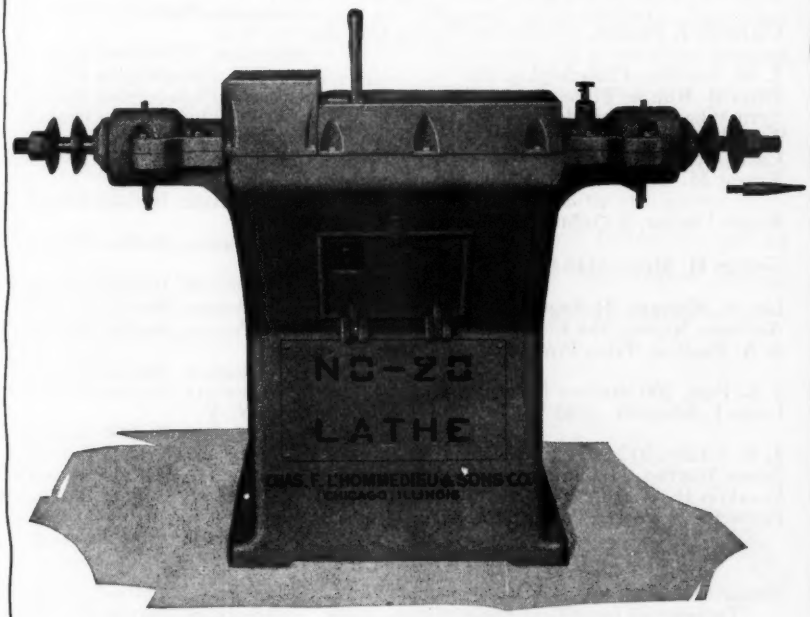

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Associate, Cleveland Branch

Donald H. Shantz, 826 Seventh St., Coroapolis, Pa.
Associate, Pittsburgh Branch

James H. Conolly, 1230 Hiland Ave., Coroapolis, Pa.
Associate, Pittsburgh Branch

Robert Magnuson, 46 Roberts St., Malden, Mass. Associate, Boston Branch

John Q. Adams, 751 Jefferson Ave., Rochester, Mass.
Associate, Rochester Branch

James A. Richardson, 613 Maple Lane, Sewickley, Pa.
Associate, Pittsburgh Branch

Clarence J. Pouliot, c/o Racine Plating Co., Racine, Wis.
Associate, Milwaukee Branch

J. W. Bardley, Philadelphia, Pa. Associate, Philadelphia Branch
Peter B. Ruppe, Philadelphia, Pa. Associate, Philadelphia Branch
Syril Wharrad, Philadelphia, Pa. Active, Philadelphia Branch
Jule Weychert, Philadelphia, Pa. Associate, Philadelphia Branch
Carl Doerr, Philadelphia, Pa. Active, Philadelphia Branch

Ernest M. Dildine, 73 Delwood Rd., Kenmore, N. Y.
Associate, Buffalo Branch

Ralph Fischer, 4 Collinwood Ave., Buffalo, N. Y.
Associate, Buffalo Branch

George H. Merz, 3446 Fulton Rd., Cleveland, O.
Associate, Buffalo Branch

Leo A. Metzger, 24 Regent Ave., Lockport, N. Y. Active, Buffalo Branch
Anthony Nigreo, 346 Ellicott St., Buffalo, N. Y. Active, Buffalo Branch

S. A. Peachin, Trico Products Corp., Buffalo, N. Y.
Associate, Buffalo Branch

J. L. Post, 200 Sanders Road, Buffalo, N. Y. Associate, Buffalo Branch

Louis J. Schustek, 2895 Lewiston Rd., Niagara Falls, N. Y.
Associate, Buffalo Branch

J. R. Vitalie, 912 N. 4th St., Olean, N. Y. Associate, Buffalo Branch
James Warren, 14 Van Vorst St., Utica, N. Y. Associate, Buffalo Branch
Franklin H. Wirge, 56 Orange St., Buffalo, N. Y. Associate, Buffalo Branch

Frederick S. Foster, 249 Willlow St., Waterbury, Conn.
Associate, Waterbury Branch

TRANSFERS

Bernard O. Case, c/o H.V.W.M. Co., 2482 W. Grand Blvd., Detroit, Mich.
Transferred from Bridgeport, Conn. Associate, Detroit Branch

REINSTATEMENTS

Stanley E. Dolman, 432 Algonquin Ave., Detroit, Mich.
Active, Detroit Branch

Samuel H. Douglas, c/o Reed Plating Co., 5778 Rivard St., Detroit.
Active, Detroit Branch

Robert L. Reed, c/o R. Reed Plating Co., 5778 Rivard St., Detroit.
Active, Detroit Branch

Ray A. Austin, 5671 Porter St., Detroit, Mich. Active, Detroit Branch

RESIGNATIONS

Richard R. Roscoe, 56 Freeman St., Wollaston, Mass.
Boston Branch

Jos. Ver Plank, Zeeland, Mich. Grand Rapids Branch
Jos. Oswald, Otis Elevator Co., Yonkers, N. Y. Active, New York Branch

Jos. Carruba, American Plating Co., 205 E. 9th St., New York City.
Active, New York Branch

SUSPENSIONS

Frank L. Sample, Jr., Yankee Electroplating Co., 249 E. Main St., Marlboro, Mass. Boston Branch